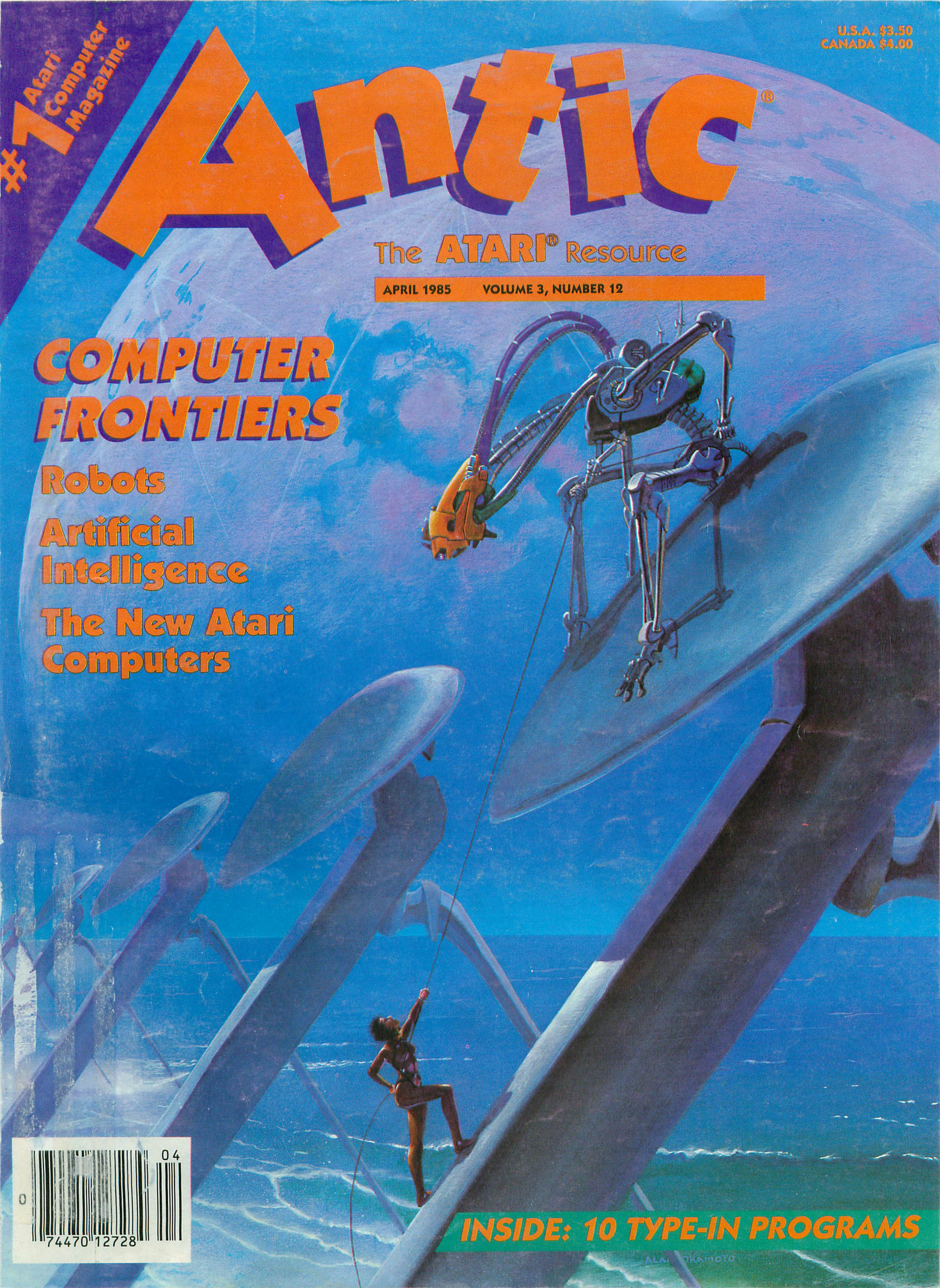
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The ATARI® Resource

APRIL 1985 VOLUME 3, NUMBER 12



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INSIDE: 10 TYPE-IN PROGRAMS


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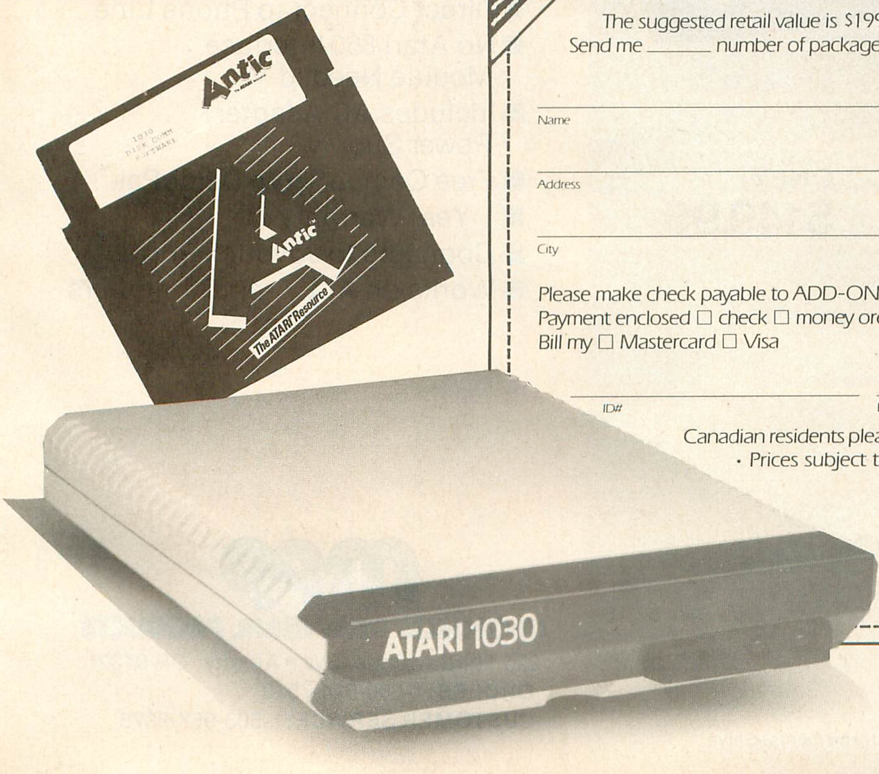
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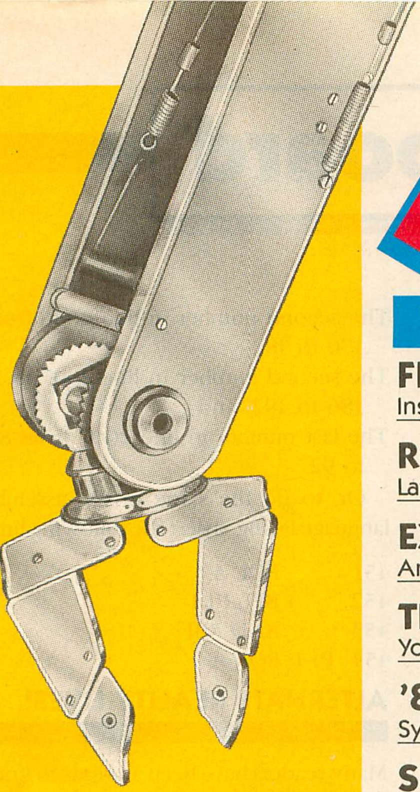
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i/o board

SELF-DELETING TYPO

Thanks for the fine utilities in the January 1985 **Antic**, "BASIC Searcher" and "TYPO II." After use, "BASIC Searcher" is self-deleted in a very neat two-line routine. I have adapted those lines to "TYPO II" so that it will remove itself after doing its work. All you have to do is type GOTO 32230 outside the program proper.

Ted Solomon
Toledo, OH

```
32230 ? "↖":FOR ZZ=3199
0 TO 32120 STEP 10:? ZZ
:NEXT ZZ
32240 ? "CLR:POKE 842,1
2:CONT";:POSITION 2,0:P
OKE 842,13:STOP
32250 ? "↖":FOR ZZ=3212
0 TO 32260 STEP 10:? ZZ
:NEXT ZZ
32260 ? "CLR:POKE 842,1
2:?CHR$(125)";:POSITION
 2,0:POKE 842,13:END
```

TYPO II KUDO

I think TYPO II is a miracle worker. No more staying up late at night trying to find a small error.

James Stephens
Jacksonville, FL

NOT SO BITTY INFOBITS

We've received quite a few letters about "Infobits" (December 1984). Our readers want to know how to erase information after it's entered. This seems to be more complicated than it sounds, but we've turned the problem over to author Andy Barton and we'll be sure to let you know if he produces a solution.

While you're waiting, Andy offers the following changes to "Infobits" that will cause the search routine to ignore the difference between capital and lower case letters, as long as the search input is in upper case. In the BASIC listing, change:

The 18th number in line 2002 from 42 to 48;
The first number in line 2004 from 191 to 185;
The fifth number in line 2004 from 223 to 217;
The second number in line 2006 from 176 to 182;
The second number in line 2007 from 186 to 192, and
The last number in line 2007 from 86 to 92.

Or, to do the same in the assembly language listing, insert the following lines:

```
451        ROL A
452        BPL P1.1
453        AND #BF
454  P1.1  ROR A
```

ALTERNATE REALITY LIVES!

Many readers have been anxious to know how soon they can get **Alternate Reality**, the fantasy role-playing game with superb graphics that we previewed in November 1984. The game was recently licensed by Datasoft (19808 Nordhoff Place, Chatsworth, CA 91311, (818) 701-5161.) Datasoft plans to market the entire seven-disk series. The first disk, "City," will be priced at $39.95.

RE-RUNNING FROM RESET

Is there any way to make a program re-run automatically if the [SYSTEM RESET] key is pressed?

Timothy Hawkins
Kentville, NS

Yes. We've included a few suggestions from the ABCs of Atari Computers *by David Mentley, reprinted here by permission of Datamost.*—ANTIC ED

This BASIC program below will POKE in a machine language routine which resets the disk boot pointer to a new program that essentially types RUN when you push [SYSTEM RESET]. This is easy to do for machine language programs, but is not so clear for BASIC programs.

To make machine language programs restart, put the initialization address in locations 12 and 13 ($0C and $0D). [SYSTEM RESET] will just start the program over.

To reset and RUN a BASIC program, type in this routine (it goes in page 6). Then LOAD your BASIC program. Type POKE 12,0 and POKE 13,6 to run the program when SYSTEM RESET is pressed. You can put the POKEs in the program if you are

continued on page 8

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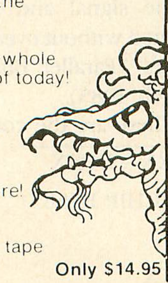


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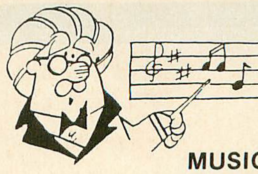
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I/O BOARD

continued from page 6

not going to have to access the disk drive in the program. (From Novatari, February, 1983.)

```
10 FOR B=1536 TO 1590:R
EAD A:POKE B,A:NEXT B
20 DATA 162,0,142,68,2,
232,134,9,173,48,2,133,
203,173
30 DATA 49,2,133,204,16
0,4,177,203,133,205,200
,177,203
40 DATA 133,206,162,0,1
60,82,189,52,6,145,205,
232,200,224
50 DATA 3,208,245,169,1
2,141,252,2,108,250,191
,50,53,46
55 LIST 60,70
60 REM ** BE SURE TO PO
KE 12,0 AND
70 REM ** POKE 13,6 AFT
ER TYPING RUN
```

POSITIONING TYPO II

If your television overscans lines, the TYPO codes will be partially off the screen and unreadable. Change the first part of line 32210 to read POSITION 2,15.

COVER COMPLAINT

Noticing your January cover, my wife said to me, "Aren't you a little old to be reading Superman comics?" The majority of **Antic** covers are so childish and comic-like that it is embarrassing to be caught reading one. Anyone seeing it on a newsstand would assume it's a kiddie magazine. I think your covers promote the detrimental concept that "the Atari is only a game machine."

C.A. Castravelli
Montreal, Canada

*Please write us **your** comments about the kind of covers you'd like to see. **Antic** cover concepts are continuing to evolve—as is the magazine as a whole. Atari users seem to getting more sophisticated, a trend that we certainly welcome. We've gotten raves for Alan Okamoto's imaginative high-tech covers on our November 1984 and March 1985 issues. Alan is back again this month and we think he's outdone himself.*—ANTIC ED.

DOS 3 FMS ERRORS

Early versions of DOS 3 contained errors in the File Management System (FMS) files. To determine which version of DOS 3 you have, type:

```
PRINT PEEK(3889)
```

If the result is 78, you own the latest version. If you get a 76, however, you've got the early version of DOS 3. Follow these instructions to update your copy of DOS 3.

1. Type in the following program listing and SAVE it to disk.

```
10 POKE 3889,78:POKE 39
23,78:POKE 3943,78
20 POKE 3929,76:POKE 38
95,76:POKE 3901,77
30 POKE 3935,77:POKE 39
55,77:POKE 2117,240
```

2. RUN the program.
3. Go to DOS, put a blank disk in your drive, and use option [I] to initialize the disk. (Remember to type [Y] to WRITE FMS.SYS).
4. Copy all the files (except the FMS.SYS file) from your Master disk to your new disk. When you're done, you should use your new disk in place of your Master Disk.

Of course, there is a better way: shun DOS 3 and use DOS 2.0S instead. You'll find an article fully describing this superior DOS elsewhere in this issue.

TAX SQUEEZE

Are you having trouble getting SynCalc to accept some of the longer cell formulas in "Income Tax Spreadsheet" (**Antic**, February 1985)?

To squeeze more characters into cells such as E68-E75, don't type spaces between words. Even more importantly, don't type in words such as THEN or ELSE or LOOKUP when you first enter the formula. You will see an onscreen syntax error message when you try to enter the formula with words missing. At this point you can insert the words in their proper places and SynCalc will let you put the "illegal" amount of characters into a cell. The final characters of the formula will be pushed beyond the visible borders of the cell, but they'll still be operational.

Also, the template's '84 tax payment rates are accurate within $1 even for incomes as low as $2,300, although they are calculated from the tax schedule instead of the tax tables.

TRAPPING BANNERTIZER

Although the "Bannertizer" program in the December 1984 issue runs as published, several readers have run into problems because of the TRAP statements sprinkled throughout the program. A TRAP statement will prevent any error from being printed and the program will, instead, branch to the line number indicated by the latest TRAP.

In "Bannertizer," for example, line 40 is: TRAP 40. Once the computer sees this, it will no longer tell you of any errors, but will go right to line 40 and continue on its merry way.

FIRST LESSON IN ASSEMBLY

Line 100 of the listing for "First Lesson in Assembly Language" (November, 1984) should read POKE 755,4 instead of POKE 775,4.

KOOKY'S QUEST

There is a line missing from Kooky's Quest, (February 1985):

```
2100 FOR S=32 TO 16 STE
P -4:SOUND 0,S,14,10:EA
=EA*EA*EA:SOUND 0,0,0,0
:EA=1^0:NEXT S
```

Including this line will prevent an error message at the very end of the game.

BUS OVERLINES

Some signal and address labels were printed without overlines in Part III of Earl Rice's "Parallel Bus Revealed" (**Antic**, March 1985).

These are the correct labels:

$\overline{\text{D8XX – DFXX}}$

$\overline{\text{CS}}$ (CHIP RESET)

R/$\overline{\text{W}}$

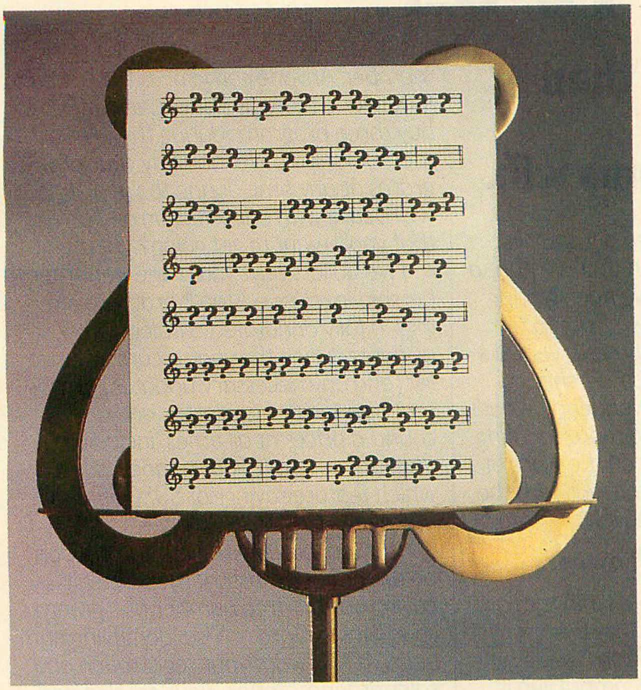
$\overline{\text{D1XX}}$

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$\overline{\text{DS}}$ (DATA STROBE)

$\overline{\text{DRST}}$ (DEVICE RESET)

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by MICHAEL CIRAOLO
Antic Associate Editor

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What's New on Antic Online could be an exclusive interview with a top Atari newsmaker, the latest upcoming products we've seen at **Antic**, or any other fastbreaking Atari news.

Following these initial screens, you'll find the Main Menu. And in case you lose your way as you start moving around Antic Online, you'll see HELP on every section menu. Onscreen command prompts throughout Antic Online also make navigation simple.

For your first time online, Antic Central (Selection 1) is a good place to start. There you'll see a description of what you can find in the electronic edition and the essential directions for getting around.

Antic Central also contains a continuously updated compilation of the Error Log which appears in the magazine. You can find out if there are any problems with **Antic** listings long before these corrections can appear in print.

Online I/O Board is your opportunity to make your views known to **Antic** editors. Also you can read the editorial responses to selected letters—our top priority here will be anwering questions that can help many Antic readers.

Back Issue Guide is an index of the contents of every Antic Magazine since we started publishing in April 1982.

Antic Authors Wanted displays topics for programs or articles that the magazine currently seeking. Also there's a complete Author's Guide that describes the pay rate and how to submit your material.

The second Main Menu category is Product Information. This area includes the unique Weekly Users Survey—which lets you vote electronically on the usefulness and cost effectiveness of recently released products. You'll be able to look at the voting results online and in **Antic** Magazine. For the first time, your voice will be heard providing important feedback for manufacturers of Atari products.

The Antic Review Archive features our latest reviews of important products. These reviews are uploaded as soon as written—often months before these reviews can appear in print! Also included is the magazine's 1984 Buyers Guide. All reviews are arranged chronologically within a sub-menu of product categories.

In the Coming Attractions section, Next Month In Antic gives you an early look at what the upcoming issue of the magazine will cover. Also, Sneak Previews offers self-contained excerpts of major **Antic** articles before they appear in the magazine.

With the Enter SIG*Atari section, you can move directly into the Atari Special Interest Group. This is the largest Atari users' group, accessed by 6,000 people and featuring hundreds of public domain programs you can download.

The Worldwide Users Network contains a directory showing you where to find your closest Atari Users

continued on next page

Group that has joined the Worldwide Users Group Network (WUN). There's also an Events Calendar that tells you about upcoming local presentations of WUN users groups.

Pals Directory, in this section, is the long-demanded exchange for Atari owners who wish to make contact with others sharing their interests.

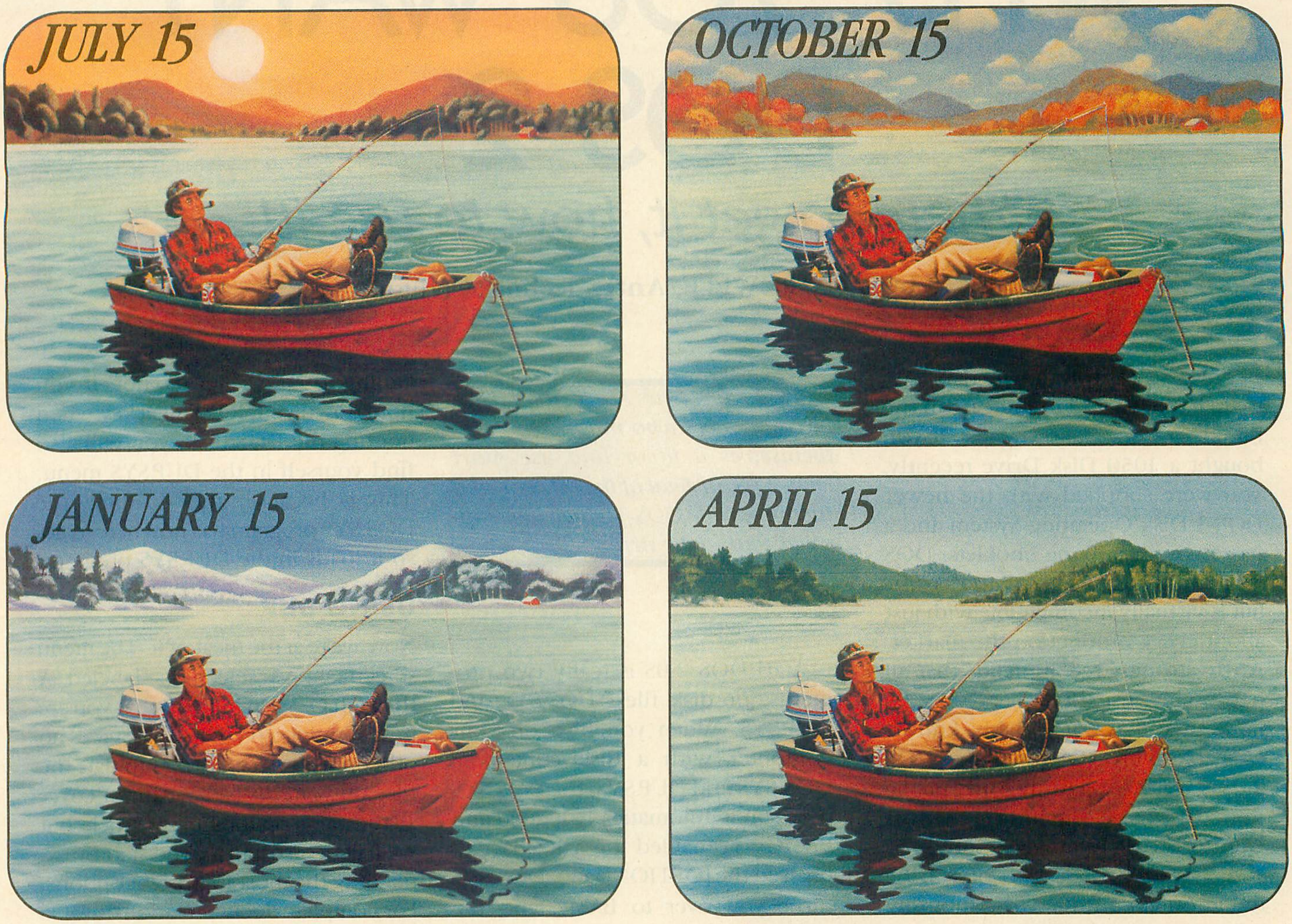
Finally, Antic Online News is the last word for information about the Atari world. The Special Exclusives are the newest and most significant news dispatches for Atari users! Permission to reprint these articles is granted ONLY to newsletters of users groups that have joined WUN.

The chronological library of previous and special-appeal news files can be accessed in Online News Bulletins.

Antic's editors look forward to chatting electronically with many of you readers. See you online!

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WHY YOU WANT DOS 2

Where to get it, how to use it!

by JACK POWELL, **Antic** Technical Editor

Because of sharply lowered prices, there has been a swift increase in the number of new Atari owners. If you bought a 1050 Disk Drive recently, you were supplied with the newer DOS 3 Disk Operating System and a few fairly mystifying booklets. DOS 3 provides increased storage density, but is virtually incompatible with just about every product on the market. **Antic** strongly recommends that all new owners use the earlier DOS 2.0S until they feel comfortably knowledgeable with DOS functions. DOS 2.0S is available on many **Antic** public domain disks (including **Moon Games**, **Antic Exclusive Games** #1 and **Super Utilities** #1) or can be found on any of the **Antic** monthly subscription disks. But since you don't have documentation for DOS 2.0S, we offer the following tutorial.

A guide for new Atari 1050 Disk Drive owners who may wish to do themselves a favor and use Atari DOS 2.0S, instead of the inferior and incompatible DOS 3 which was supplied with their drive.

WHAT IS DOS?

The first thing you should understand is that DOS is simply a program. Period. It is written in machine language and works like any professional game or word processor that starts up as soon as you boot (turn on) your computer.

Just as a game, when booted, loads into memory and tells your computer to put animated characters on the screen, DOS, when booted, loads a program into memory that tells your computer how to deal with your disk drive.

Atari DOS 2.0S is really two programs, or disk files: DOS.SYS and DUP.SYS. When you turn on your computer with a disk containing DOS.SYS and DUP.SYS, the DOS.SYS program is automatically loaded and BASIC is enabled (if you haven't pressed the [OPTION] key). DOS.SYS turns you over to BASIC and the READY prompt appears. You can now do anything you wish in the BASIC language, but DOS.SYS is still there waiting to act upon any BASIC commands it recognizes.

One of these BASIC commands is: DOS. This can be confusing because, when you type DOS, the DOS.SYS program in memory runs another program called DUP.SYS and you find yourself looking at a menu of choices. You are now no longer in BASIC. You are in DUP, which stands for Disk Utilities Package.

Still with us? To make things a bit more confusing, we should tell you that when you type DOS from BASIC, this is always called "going to DOS." It might be clearer if it were called "going to DUP", but it's not. If you hold down your [OPTION] key when booting the DOS disk, you will also find yourself in the DUP.SYS menu. This is because, after loading, the DOS.SYS program has nowhere to go, so it loads in the DUP.SYS program.

USING DUP

Now we're at the meat of it. The menu screen shows selections labeled A through O. Keep in mind that you are now running a program that serves no other purpose than to manipulate the files on your disks. We cannot cover all the menu options in this article, but we'll get you off to a good start by explaining the most important options. For complete documentation on DOS 2.0S, we recommend *Your Atari Computer* byLon Poole. (458 pages. $17.95. Osborne/McGraw-Hill. 2600 10th Street. Berkeley, CA 94710. (415) 548-2805.) Here are the most commonly used DUP.SYS menu commands:

A—DISK DIRECTORY

To find out what files are on your disk, press [A][RETURN][RETURN]. If the files scroll beyond your screen, you can temporarily halt the scrolling by holding down [CONTROL] while pressing [1]. Repeat this same sequence to start the scrolling again. While you're in DUP.SYS, you can put other compatible disks into your drive and manipulate their files.

B—RUN CARTRIDGE

When you press [B][RETURN], you will be returned to whatever cartridge is in the machine. If there is no cartridge, you will return to the built-in BASIC. (You can also return to BASIC any time you press the [SYSTEM RESET] key.)

D—DELETE FILE

Be careful here! There is no going back.

This might be a good place to talk about Reading and Writing. Many of the disk utilities in DUP either read from the disk or write to the disk. Reading will harm nothing, but writing can permanently erase information that was on the disk. If you wish to avoid any writing on a particular disk, place a write-protect tab tape over the notch on the side of the disk. This blocks a beam of light in the drive and tells it your disk is protected. If you attempt a write command from DOS onto a write-protected disk, you will get an error message, which is better than losing a file.

When you press [D][RETURN], the computer will prompt, DELETE FILE SPEC. Simply type in the name of the file you wish deleted. With a single drive, you can leave off the D: and just type in the filename. This is true of all DUP.SYS commands. Press [RETURN] and the computer will ask you if you really want to delete that file. Do you?

E—RENAME FILE

You can change the name of any file by simply pressing [E][RETURN] and then typing in the old filename followed by a comma and the new filename. Caution! It is not a good idea to have more than one file with the same name. If this happens, you will only be able to access one of those files.

F—LOCK FILE

A locked file is protected from any change. Press [F][RETURN], then type in the filename. When you now look at the directory (press [A][RETURN][RETURN]), your locked file has an asterisk [*] before it. It can no longer be deleted or renamed. If you're in BASIC, you cannot SAVE to a file that has been locked.

This might be the place to mention the subject of Wild Cards. Just as in a deck of playing cards, Wild Cards can stand for anything, depending on where they are placed. There are two kinds of Wild Cards, and we'll explain the most commonly used type here.

When typing in a filename (which can be as many as 8 characters followed, if you wish, by a period and a 3 character extender) you may substitute any portion of the filename or extender with an asterisk [*]. DUP.SYS will ignore everything to the right of the asterisk in either of the 2 fields. Thus: D:AT*.BAS will be seen as any and all files that begin with AT and have an extender of .BAS. If you wish to lock all the files, press [F][RETURN] followed by *.* . If you only wish to lock those with .BAS extenders, enter *.BAS.

G—UNLOCK FILE

This is exactly the opposite of [F] Lock. The [F][RETURN] and [G][RETURN] commands are a good place to experiment with Wild Cards. You can't do much damage here.

H—WRITE DOS FILE

Here is your opportunity to create new DOS 2.0S disks. When in DUP.SYS, insert a blank disk and format it using the I option (described below). Now press [H][RETURN], answer the prompts, and both DOS.SYS and DUP.SYS will be written to the new disk. This should always be done before any files are placed on the new disk.

I—FORMAT DISK

WARNING! This function will wipe your disk clean. It will override locked files and there is no turning back. You will be given a couple of prompts, however, before committing yourself. A disk that is to use DOS 2.0S must be formatted by DOS 2.0S. You cannot write DOS 2.0S on a disk that has been formatted with DOS 3.

J—DUPLICATE DISK

This option will permit you to copy an entire DOS 2.0S disk and all its files. It will not duplicate professional software that has been copy-protected. You will be given a series of prompts in which you must trade back and forth between the Source disk and the Destination disk. The Source disk is the disk with the original files, the Destination disk is the disk the files are going to. For safety's sake, place a write-protect tab on your Source disk.

L—BINARY LOAD

This will LOAD and in many cases, RUN a binary, or machine language program. These files will usually have an extender of .EXE, .BIN, .COM, or .OBJ. Simply type [L][RETURN] and follow the prompt with the filename. If the file is not a binary file, you will be told.

O—DUPLICATE FILE

Use this [O][RETURN] command when you wish to move one file from one disk to another. As in the [J][RETURN] command above, you will be prompted to trade back and forth between Source and Destination disks. Again, use a write-protect tab on the Source disk.

ACCESS FROM BASIC

If you're like many new Atari users, you will soon get quite familiar with

continued on next page

the commands to SAVE or LOAD a program from BASIC. But you may be a bit confused about LISTing or ENTERing a program. These four commands are a function of the BASIC language and are the same no matter what DOS you use.

When you type: SAVE: "D: MYGAME.BAS" from BASIC, the disk whirrs and you have copied the BASIC program in memory to the disk (device D:) under the filename MYNAME.BAS. The program is still in memory and it is now also written on the disk. By using the command SAVE, the program is written on the disk in what is called a "tokenized" form. This simply means that it's there in a kind of code.

If you want to know what this tokenized code looks like, LOAD a program into memory and type: SAVE "S:". You'll see a bunch of garbage scroll across the screen. This is the tokenized program. If you simply type LIST, the same program will scroll across the screen in standard ATASCII form and be quite readable. Now, if you type: LIST "D:MYGAME. LST", this same program will be LISTed to disk, but will now be on disk in the same ATASCII form that it was when listed on the screen.

A SAVEd program may be RUN from disk or LOADed from disk. A LISTed program may only be ENTERed from disk. For the example above, you would type: ENTER "D:MYGAME.BAS"

Once ENTERed, it may then be RUN. Also, if a program is already in memory when a second program is ENTERed, the second program will merge with the first. This is not true of a LOADed program.

Caution! do not type LIST "D:MYGAME.LST" when there is nothing in memory. You will then have written a file to disk consisting of nothing and possibly wiped out a file of the same name that was already there. If you have a printer, you may list your program to it by typing: LIST "P:". You have now listed your program to the printer device.

The best way to master all these commands is to put together a disk of duplicated program files and experiment. As long as you use backups you have nothing to lose and the computer will be only to happy to teach you.

FIRST LOOK

INSIDE THE NEW ATARI SUPER COMPUTERS

Meet the 16-bit 512K Atari. . .and more!

by NAT FRIEDLAND, **Antic** Editor

The future of personal computing is here—and Atari is delivering it at about half the price of the competition.

The 1985 Atari computers, peripherals and software are BETTER than what has been considered the leading edge of PCs up till now. The unprecedentedly low prices for the new Atari line do not mean that these products are merely cheapened copies of the leaders. Atari microcomputers now ARE the leaders.

When Atari vice president Leonard Tramiel was asked how the company could sell a 10 megabyte hard disk for under $600, he replied, "Why does everybody else charge so much for a hard disk?"

In only six months, the new Atari got six new computer models ready to manufacture—along with an impressively complete new line of printers, monitors, disk drives and productivity software. The previous Atari management hadn't been able to add to the XL line since 1983.

This report is being written on the day following the January Consumer Electronics Show, where the full line was first displayed. (**Antic** had obtained a special sneak preview a few days earlier.) Because of Atari's all-out push to meet the CES deadline, full technical documentation for the new computers is not available as of this writing.

However, **Antic** is rushing into print with the most important details we know as of now. Please keep in mind that some of these prices, model numbers and specifications may be changed by the time the products actually start appearing in stores during March and April.

16-BIT ST SERIES

Three of the 1985 computers are starting off an advanced new 16-bit line. Atari will price the 130ST at $399, the just-announced 260ST would be $499, and the 520ST lists at $599. Memory size is the only difference between these models—respectively 128K, 258K and 512K. According to Atari, the STs are not expandable.



ATARI® 520ST™ PERSONAL COMPUTER™

The ST microprocessor is the Motorola 68000, the same chip used in the much higher priced and monochrome-only Macintosh. Despite the ads for the Mac, the 68000 is a 16/32-bit chip as opposed to a true 32 bits. It has eight 32-bit data registers and eight 32-bit address registers. However, the data bus is 16-bit and the address bus is 24-bit.

The 68000 supports seven levels of interrupts, 56 instructions, 14 addressing modes and five data types. But the chip's 16-bit operating code combines an instruction and addressing mode, GP register number, an op-mode and instruction-specific data. These multiple combinations provide over 1,000 actual usable instructions.

The 68000 runs on the ST at a speed of eight million cycles (8Mhz) per second—that's much faster than the Mac runs. The ST computers have a cleanly designed 196K built-in ROM, which is expandable to 328K with plug-in cartridges.

continued on next page

ST GRAPHICS

As you might expect, the ST series really shines with graphics. A built-in drawing program similar to MacPaint has been announced. The 32K bit mapped screen supports three graphics modes. Low resolution is 320 x 200 pixels in 16 colors, medium resolution is 640 x 200 pixels in 4 colors, and there's a monochrome high resolution of 640 x 400 pixels.

However, there are 512 colors available in the low and medium resolution modes—eight levels each of red, green and blue. At the CES, a sample display screen showing these colors on the new Atari 12" RGB Analog SC1224 (under $200) was quite a mind-boggling sight. This monitor was also shown with a built-in 3 1/2" disk drive.

All the graphics capabilities described above are supported by various models in the new Atari lineup of video monitors priced from $150 to $300. The SM124, priced under $200, is the high resolution monochrome model.

ST PORTS

The entire rear panel of the ST is honeycombed with ports. There are both a Centronics parallel interface and an RS232C serial interface. Interfaces for both hard disk and 3 1/2" disk drive are built in. There are two joystick ports, one of which will support a 2-button mouse. The video ports will support standard television as well as low resolution composite video, medium resolution RGB and high resolution monochrome.

Musicians can get professional state-of-the-art sound with MIDI in-out ports. MIDI (Musical Instrument Digital Interface) gives your ST the control of multiple synthesizers in an emulated multi-track digital recording studio. We saw the ST impressively demonstrating the MIDI ports by controlling playback on the new Casio CZ-101 $499 synthesizer.

Built-in ST sound includes three channels of frequencies controllable from as deep as 30Hz to higher than audible range. There are separate frequency and volume registers, plus ASDR, dynamic envelope control and a noise generator.

A separate microprocessor handles the sleek ST keyboard, which contains a 10-key pad and a separate one-touch cursor section as well as a standard typing layout. There are 10 programmable function keys and an UNDO key. The entire unit looks as if it belongs on a $3,000 office computer.

TOS AND GEM

The ST models' TOS (Tramiel Operating System) is easily accessible through the icon-driven GEM (Graphics Environment Manager).

GEM was designed by Digital Research, which created the first microcomputer operating system, CP/M. Programmers who know CP/M will already be familiar with TOS. The ST is to come with your choice of BASIC or Logo.

C and Pascal are the professional program development languages of choice for GEM. (Atari users familiar with ACTION! will find these languages easy to learn.) Much of the software originally written for the IBM PC or the Macintosh will be easily transportable to the ST computers. A number of popular programs may well be converted by summer.

GEM supports a variety of widely-used graphics call formats, including the ANSI standard Computer Graphics Interface and 32K X 32K VDI integer coordinate system. This gives GEM portability for workstation-quality graphics applications. GEM can also add advanced raster operations and raster fonts.

Other GEM features are drop-down menus, windowing, bit block transfer, vector drawing, a real-time clock, 2-button mouse controller.

The GEM icon desktop has a calculator, a wastebasket, file folders—even a Breakout game for recreation.

XE COMPATIBILITY

The main thing to be said about the new Atari 8-bit XE models is that they are engineered for 100% compatibility with the existing XL line and the 800/400. The keyboard resembles the classy ST design minus a separate 10-key pad and one-touch cursor.

The poorly-accepted DOS 3.0 has been dropped in favor of a new DOS 2.5. This was designed by Bill Wilkinson of Optimized Systems Software, the father of Atari disk operating systems and an **Antic** contributor. As you'd hope, Wilkinson's new DOS 2.5 closely resembles DOS 2.0S and is entirely compatible with it.

The 65XE is the 64K replacement for the 800XL and will be priced at under $120. The star of the series is the 130XE which has 128K memory and will sell for "well under $200" — or approaching $150.



ATARI® 65XE™ PERSONAL COMPUTER™

In welcome news for many Atari owners, the 130XE will retain the open parallel bus to accommodate powerful plug-in peripherals. The PBI will even be improved over the current XL version. It will have improved timing and a built-in +/- 5 volt power amplification.

Reportedly, this last-minute decision to continue PBI came at an engineering meeting called by Atari president Sam Tramiel in response to

Antic's strong write-in campaign on the CompuServe Atari SIG.

The first self-contained portable Atari is the 65XEP, selling for under $400. Built into this 64K machine is a 3 1/2" disk drive and a very clear 5" green monitor. The unit is about half the size of a Kaypro luggable micro.

When the new polyphonic AMIE super-sound chip is finalized this spring, it is to be marketed in an alternate 64K computer called the 65XEM.

Monitors for the 8-bit XE computers include the XM128, about $150, a crisp 12" green monitor with a built-in 80-column card for professional-quality word processing. There's also the bright XC1411 composite 14" color model for under $200. And naturally all 8-bit Ataris are compatible with standard television sets.

DISK DRIVES

The 8-bit XE models will operate with either the current 5 1/4" floppy disk format, or with the new 3 1/2" disks which are used in the 16-bit ST series.

The 3 1/2" drive is the SF354 model with 500K capacity, priced under $200. Atari is now also considering a 250 K drive for about $150, to be called the SF324. These 3 1/2" drives and the projected ST hard disks will transfer data at a sizzling 1.3 megabytes per second on the 16-bit computers. For the XEs, the goal is to boost the speed to 30,000 from the current 19,200.

The under-$600 SH317 hard disk was not shown at CES. And there still is doubt about whether it will store 10 or 15 megabytes of data, or whether there will be separate hard disk models at each capacity.

In 5 1/4" floppy disk drives, the current 1050 model will gradually be replaced by the compatible XF521. This drive will sell for about $150, support true double density with DOS 2.5 and match the looks of the XE computers.

PRINTERS

Atari's full line of printers (and monitors) will also be marketed with interfaces for IBM, Apple and Commodore computers. These new printers all seem much sturdier and more effective than any printer that has ever carried the Atari imprint before.

For only about $150, you can choose between a slow (12 cps) but true letter-quality daisywheel printer, an 80 characters per second dot-matrix printer that produces graphics virtually as good as the Apple Imagewriter, or a 50 cps non-impact dot matrix that prints sharp copy in multiple colors. A black-only 20 cps non-impact dot matrix will sell for $99.

Under various model numbers, these new Atari printers can be purchased with interfaces for either the 8-bit or the 16-bit computer lines.

SOFTWARE

In its own right, the '85 Atari software is as spectacular as the new hardware. The emphasis is on state-of-the-art productivity applications, and the prices are almost all under $49.95.

The undisputable star of Atari's new software is Infinity, a second-generation integrated program that's more powerful than Lotus 1–2-3. Yet it will sell at only $49.95 for XEs and about $70 for the STs. (It also runs on XLs and even on the 800, though it loses multi-tasking and windowing capability.)

Infinity has a spreadsheet, a relational database, a word processor that displays all special lettering onscreen, business graphics and telecommunications. It also includes icons, drop-down menus, multi-tasking windows and integrated printing.

The program will support the upcoming Atari local area networking (LAN), for multiple Ataris cabled together. Infinity runs in virtual memory to take advantage of the expanded Atari disk drive capacities.

Admittedly, all this is a bit hard to believe about software that can operate with as little as 64K memory. A developer of the program told **Antic** that Infinity was able to pack in so many advanced features by "optimizing" the assembly language compilation. Until now, optimization has been used mainly for advanced military and government-agency software. It's a tedious process that requires painstaking line-by-line program compression analysis.

Other hot Atari software—virtually all priced under $49.95—includes:

AtariWriter Plus—Contains spelling checker and mailing list, the 128K version resides entirely on one disk.

Silent Butler—Personal finance software that tracks multiple checking and credit card accounts. It has the unique capability of printing on your own personalized checks, using a slotted holder that fits in your printer.

Shopkeeper—A small business accounting package that will ultimately be in six modules. The first release emulates an electronic cash register, counts inventory and compiles daily reports.

Song Painter—Joystick-controlled music construction program that replaces standard musical notation with easily-understood colored line patterns and icons.

THIRD PARTY PRODUCTS

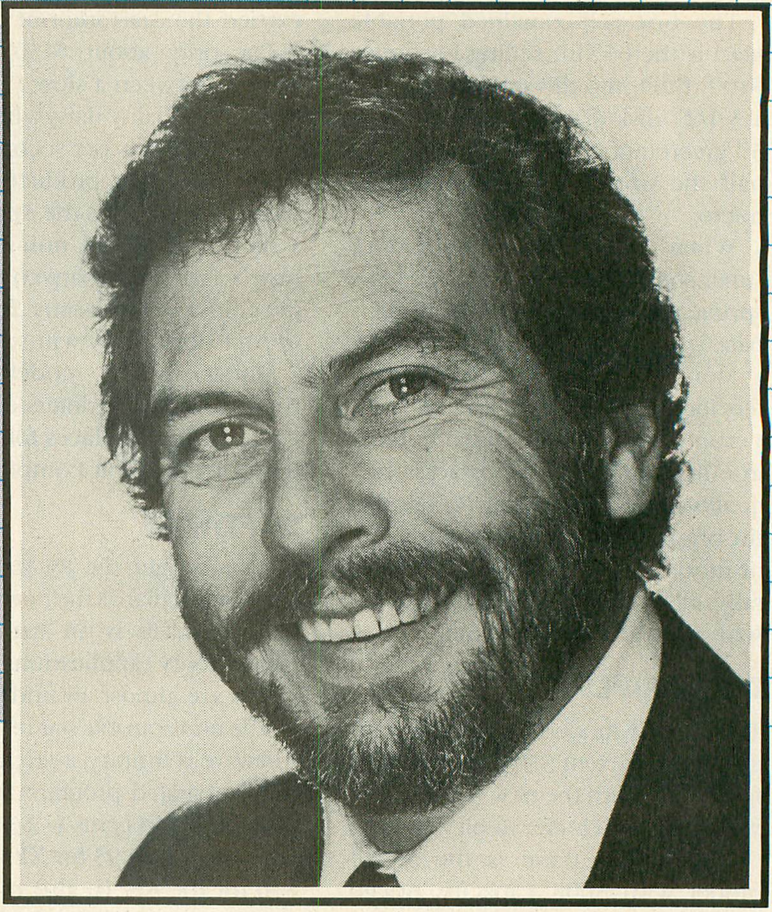
Some of the best things for the Atari we saw at CES from third party developers were Paper Clip, the powerful and simple new word processor from Batteries Unlimited, and the new line of Star printers. . .

Star's SG-10, the model that replaces the Gemini 10X, prints near letter quality at 60 cps and draft quality at 120 cps. Yet it's priced at only $299. The new top-of-the-line SB-10 has 24 wires, costs about $900 and prints dot-matrix lettering that looks almost exactly as if it came from a daisywheel.

Be sure you don't miss the next issue of **Antic** when we'll cover Atari's technological breakthroughs in even greater depth.

And for the very latest-breaking news about the exciting new 1985 Atari developments, be sure to look in on CompuServe for Antic Online's Special Bulletins.

Atari's Founder Goes ROBOTIC



©1985 Roger Ressmeyer

Nolan Bushnell's $119.95 Programmable Robot!

by NAT FRIEDLAND
Antic Editor

Nolan Bushnell, the Silicon Valley legend who brought out the first videogame, "Pong," and founded the Atari company has tooled up for his first major push into the consumer electronics market since his Atari non-competition contract ran out in November 1983.

He's gambling that significant numbers of computer hobbyists are eager to step into 3-D interaction with what he calls "the peripheral of the '80s" — robots.

But judging from the tremendous reader response to the three-part **Antic** robot series (12/83, 1/84 and 6/84) as well as the eager questions about robots that we are asked every time someone from **Antic** speaks at a users' group, Bushnell may well be right again.

Bushnell's Sunnyvale-based Axlon company is producing the first mass-merchandised low cost computer-programmable robot, the $119.95 Andy.

Before this summmer, Andys made in Hong Kong are supposed to start arriving at major retail outlets like Toys 'R' Us. Bushnell believes that the price can eventually be brought down to $70, after enough robots have been manufactured to create economies of scale.

However, unlike so many of the "coming soon" products **Antic** covers, a preview edition of Andy is available right now. Axlon has the components to assemble 10,000 Andys at its Sunnyvale workshop. And these robots are now being marketed via mail-order ads in **Antic** and other key computer magazines as well as via direct mailing to our subscribers.

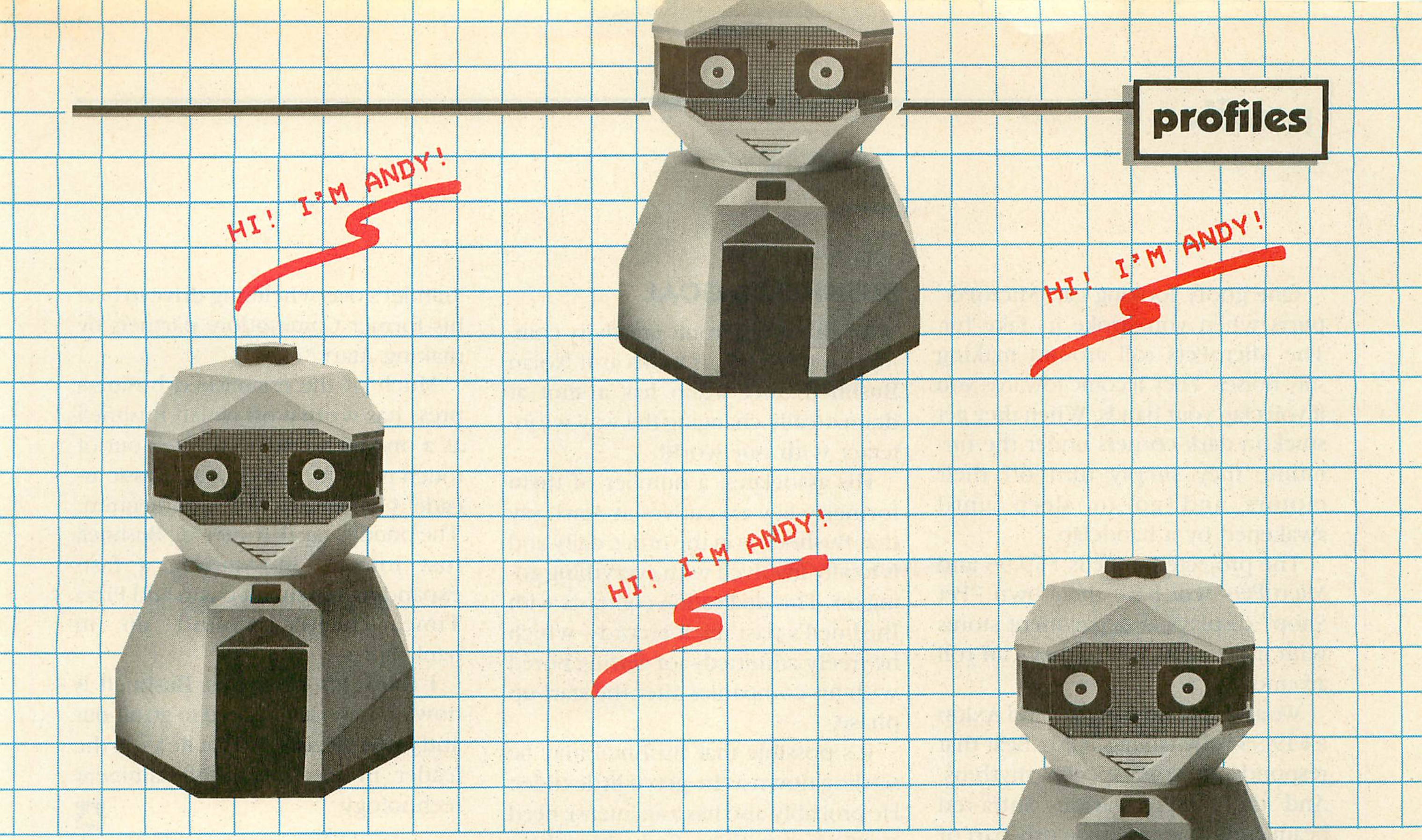
PERSONALITY ROBOT

The **Antic** Editors have seen Andy in action both at the magazine office and at Axlon. We've seen other affordable robot models too and Andy is clearly the most programmable and most versatile "training robot" so far.

Andy's long cord plugs into joystick port 2 of an Atari 800, 800XL, or 600XL with 48K expansion (or a Commodore 64, for that matter). Direct joystick control is available via port 1. But most programmers will probably be more interested in getting Andy's responses to a series of instructions in BASIC.

The included disk software also includes a "Personality Editor" that lets the non-programmers in the family set up robotic behavior patterns by using English, Logo-like, or BASIC-like commands plus menu options.

Andy has feedback sensors for light, sound and touch. The robot can wheel its way through mazes, roll through a complex programmed route, automatically back off from immovable obstacles it touches head-on. It makes sounds as it maneuvers at



two speeds on all floor surfaces.

Andy admittedly can't do much that's immediately useful. Andy is being marketed as the first home introduction to current robotics technology. The theme is, "Andy can't bring you breakfast in bed, but he will give you food for thought."

ANDY'S DAD

Nolan Bushnell loves having fun with technology. His black-glass desk is like what the boss of the computer company had in "Tron." The desk has two built-in computer monitors, a pull-out keyboard and a full line-up of LEDs and switches that control things like window shades and the hidden video projection screen.

"It's great when it's all working, but like most prototypes it breaks down a lot," said Bushnell. He's a tall, bearded former engineer from Utah. And even people who disapprove of his flamboyant business style have to concede that the man has monumental charm and charisma.

Antic's exclusive interview started with Bushnell wanting to know all the latest Atari gossip. "You never forget your children," he laughed. The Atari 400 and 800 computers were developed while he owned the company, but marketed under the Warner Communications management.

"I think the biggest mistakes Warner/Atari made were closing off the architecture and the serial bus of the computers," he said. "It was wanton mishandling of technologically superior machines. At least now I can be cautiously optimistic that Atari will prevail under Jack Tramiel. And all those evangelical Atari users will be vindicated."

Historical commentaries having been made, Bushnell swiftly turned the conversation to robots. "I believe that personal computers are essentially robots without limbs," he said. "And it's going to take an breakthrough in useful home robots to move computers onto a ten-times greater level of acceptance during the next five years."

Bushnell admitted this breakthrough hasn't been made yet. "What we really need is the right software—a VisiCalc for robots," he said.

But he feels that even now robots can be challenging experimental tools for personal computer users. "It's a new horizon for the hobbyist, artificial intelligence and personality simulations. It can develop an additional level of awareness about how people perceive emotional states."

Bushnell said, "True robot pets are just about here. It's a lot easier to simulate a stalwart pal that's more entertaining than a real pet, than it is to computerize actual high-level reasoning or operation of an opposable thumb."

Going along with this line of thinking, Axlon also has a 1985 line of MicroPet toys for the non-computing public. They're cute enough to make Cabbage Patch Dolls look like wallflowers—sort of like miniature Chuck E. Cheese Pizza Time Theater characters on hidden wheels.

The MicroPets aren't programmable. But since they were designed after Andy, they tend to have slightly more sophisticated sensors which will obviously be showing up in later Andy models.

continued on next page

One goofy looking cat, MicroPet, purrs when you stroke its fake fur. The MicroPets roll around making silly noises. They'll come towards you if you clap your hands. When they get stuck in dark corners under the furniture, they simply turn off their motors and go to sleep until awakened by a handclap.

The projected price is $59.95 and MicroPets will have their own "Pet Shop" displays at department stores with little yards where they can roll around.

We also spotted lying around Axlon a $49.95 baby-talking Teddy Bear that responds to your speech rhythms. And there were various infra-red beam guns that are apparently part of some cops-and-robbers type of survival game.

BUSHNELL'S GOAL

With all this electronic creativity coming out of Axlon, it looks as if Nolan Bushnell once again has a shot at dramatically changing the way we interact with our world.

His associates, a number of them formerly key executives at Atari, say that Bushnell is in the office daily and is totally involved with everything going on. This dedication contrasts with Bushnell's past track record—which he freely admitted—of getting bored with his companies after the start-up phase.

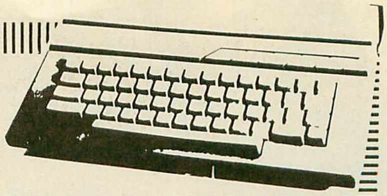
It's possible that Bushnell may be settling down as he gets a little older. He probably also has a an intense need to prove something. Something that's only a bit more subtle than Jack Tramiel's overwhelming drive to beat his former Commodore partners by making Atari #1.

Much of the established business press has written off Nolan Bushnell as a one-hit wonder who fell out of touch with the market after classic arcade videogames lost momentum. The pundits say that after all, Bushnell lost interest in running a fast-expanding restaurant chain and Pizza Time Theater wound up in bankruptcy.

I think it's clear that Bushnell is now fiercely determined to go all-out and prove decisively that he's still the leader in electronic entertainment technology.

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ROBOT UPDATE

Latest robot-Atari interface news

by MICHAEL CIRAOLO, **Antic** Associate Editor

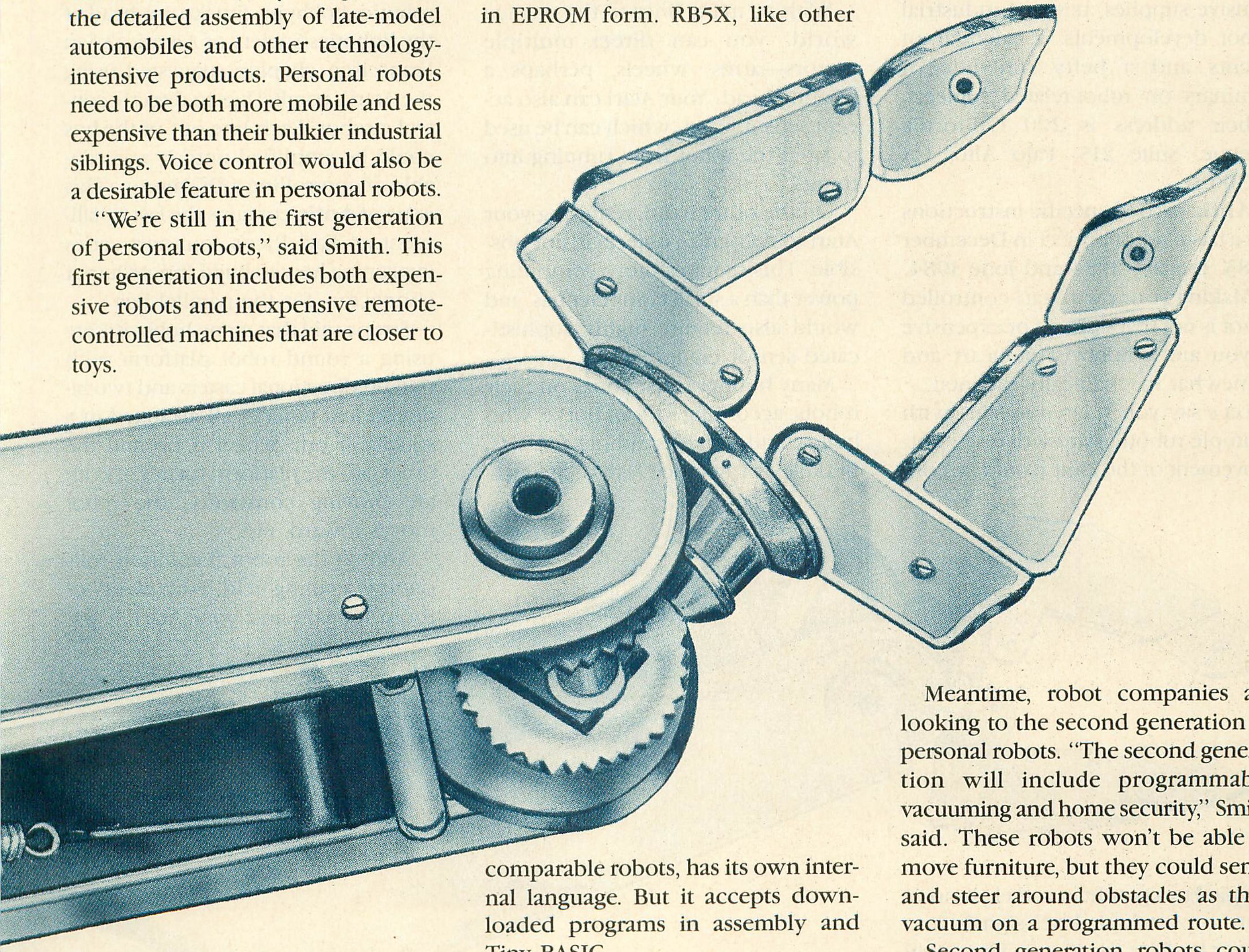


The day isn't here yet when your personal robot can perform most household chores and is the family's third major purchase after home and car. But it's not that far away, either.

"Optimists say that in five to ten years a robot will meet you at the front door with the newspaper and a martini. It will cook dinner, teach the kids and keep grandmother company," according to Sharon Smith of RB Robot Corporation in Golden, Colorado.

Smith's scenario covers personal robots, as opposed to the industrial robots that are already doing much of the detailed assembly of late-model automobiles and other technology-intensive products. Personal robots need to be both more mobile and less expensive than their bulkier industrial siblings. Voice control would also be a desirable feature in personal robots.

"We're still in the first generation of personal robots," said Smith. This first generation includes both expensive robots and inexpensive remote-controlled machines that are closer to toys.



WHAT THEY DO

The typical first generation robot like the RB Corp.'s **RB5X**, or the Heath Company's **HERO-1** kit costs about $1,500, looks like R2D2, can move around in a programmed pattern, sense walls, doors, people and other obstacles, and monitor its own energy level.

RB5X and HERO-1 are both expandable. You can add, at substantial extra cost, extendable manipulator arms, voice synthesizers, and so on. But that still doesn't mean these robots can do anything as practical as walking your dog or answering the door.

TINY BASIC

RB5X is fully programmable from most computers, including the Atari. It has an RS232 port, through which you can download a program into RAM, or install a debugged program in EPROM form. RB5X, like other comparable robots, has its own internal language. But it accepts downloaded programs in assembly and Tiny BASIC.

Tiny BASIC can be programmed on the Atari and other microcomputers using a text editor. It is a compact form of BASIC that supports only integers and has no strings. A command to go RIGHT FORWARD would read as @#7802=#08.

Other, cheaper, robots are remote-control toys directed through the Atari's joystick port. The **Think Tank** ($100, 3R Robotics, Houston, Texas), connects your Atari to a radio-control module so you can use the joystick or keyboard commands to direct a model tank.

SECOND GENERATION

"The cost of personal robots will go up as robots are able to do more things," Smith predicted. 'There's a balance between cost and what the robot can do. Right now, robots are a little expensive for what they actually do."

Meantime, robot companies are looking to the second generation of personal robots. "The second generation will include programmable vacuuming and home security," Smith said. These robots won't be able to move furniture, but they could sense and steer around obstacles as they vacuum on a programmed route.

Second generation robots could also be responsible for home security—they could sense intruders and other hazards, and notify the police, fire department, or paramedics.

First and second generation robots

continued on next page

both depend on three separate but interactive technologies.

The robot must have sensors, usually sonar, touch-sensors or infrared. The robot must also have a way of physically affecting its environment, such as wheels for mobility or manipulator arms. And the robot must have computing power.

DOING IT YOURSELF

As the robot craze continues to catch on, there is more information available for hobbyists who want to make their own robots.

The **Robotics Society of America** offers tips on finding inexpensive supplies, news of industrial robot developments, a calendar of events and a hefty schedule of seminars on robot-related subjects. (Their address is 200 California Avenue, Suite 215, Palo Alto, CA 94306.)

Antic carried specific instructions for a basic robot project in December 1983, January 1984 and June 1984.

Making your own Atari-controlled robot is not that difficult or expensive if you are a hobbyist at heart and somewhat mechanically inclined.

Let's say you wanted to start with a simple robotic arm with one joint. Movement of the joint would be coupled to a gear train and electronics that convert logic-level signals into power to drive the motor. The actual arm can be made from an Erector set, wood, metal or any material you can work easily.

Instructions for the arm come from your Atari via the joystick port, so you would need a DB-9 connector and some cable wire.

A simple BASIC program would open the joystick port and send the appropriate pulses. If you wanted to extend the robot arm, you'd turn on the servo, and send it pulsed messages for as long as you wanted it to continue extending.

ROBOT I/O

After you've produced remote-controlled motion, you can think about the next step. Each joystick port contains four pins which can be set for input or output. On the Atari 800, with four ports, you can have sixteen lines, or 65,536 external operations (that's 2 to the 16th power).

With so many lines to the outside world, you can direct multiple motors—arms, wheels, perhaps a rotating head. Your Atari can also accept sensor input, which can be used to keep the robot from running into things.

On the other hand, requiring your Atari to recognize objects is not possible. This requires more computing power than a small computer has, and would also require highly sophisticated sensor equipment.

Many hobbyists use sonar on their robots, according to Tom Burke, who builds and services robots for U.C. Berkeley's Lawrence Hall of Science. Until a few years ago, sonar was very expensive. But with the advent of Polaroid's sonar-using autofocus cameras, the technology became small and cheap enough for hobbyist.

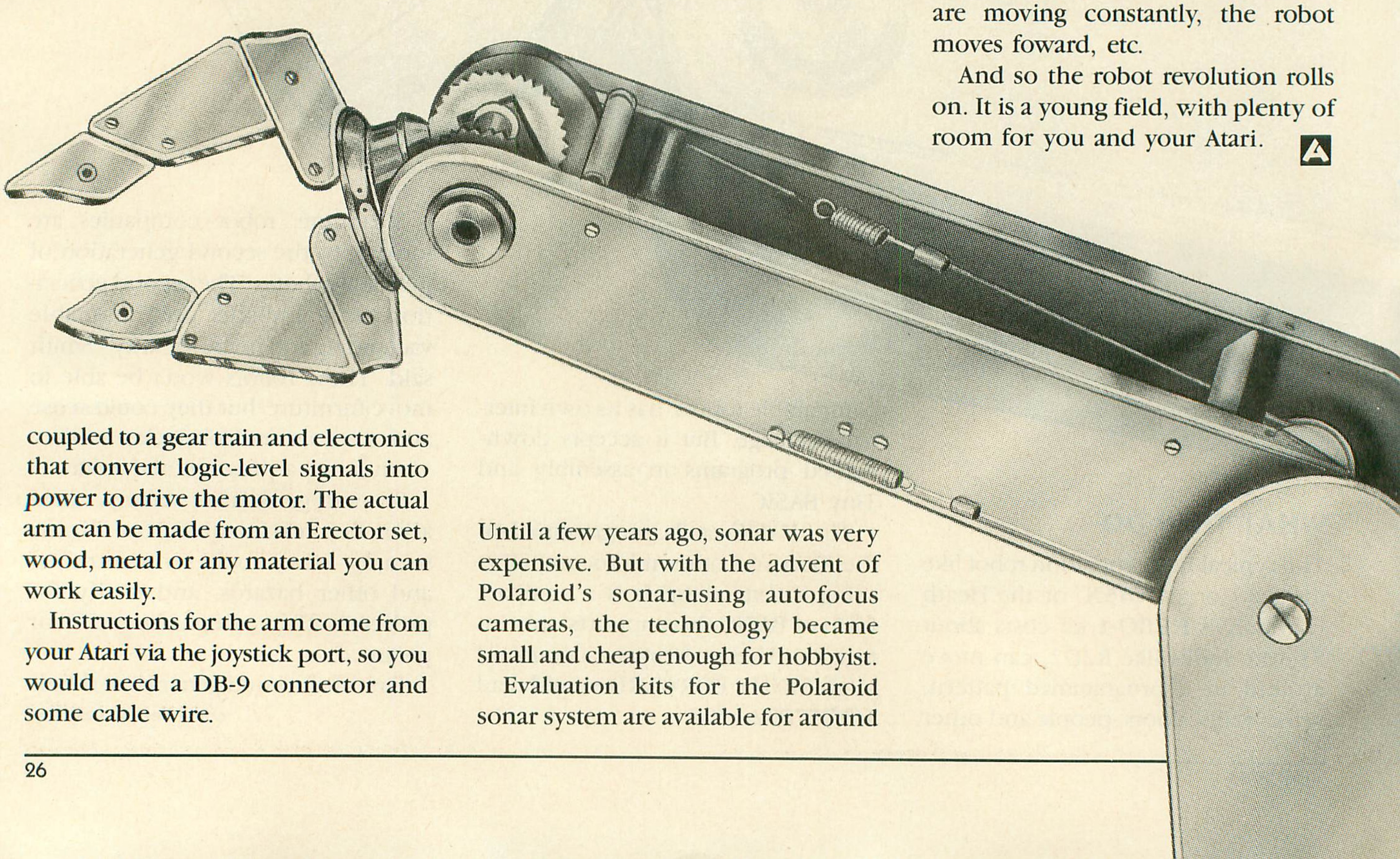
Evaluation kits for the Polaroid sonar system are available for around $100, said Burke. These kits can be interfaced to an Atari. The sonar has a range between one and 39 feet, and a resolution of one inch. Of course, the further from the source, the less the accuracy.

Inexpensive Radio Shack infrared LEDs and phototransistors, of the same wavelength, can be wired into a circuit that will follow a line on the floor, according to Burke. The phototransistor will measure the difference between light and dark, keeping the robot on a track over a one-color painted line.

Of course, these are not the only avenues open to the would-be robotics hobbyist. Jim Strope, head of the Robotics Society of America's San Franscisco chapter, suggested using the Atari's parallel bus to directly control a robot. Each line out of the bus could be amplified until it was capable of controlling a DC motor. (This issue of **Antic** contains the last installment of Earl Rice's four-part series explaining how to build Input/Output connectors for the parallel bus.)

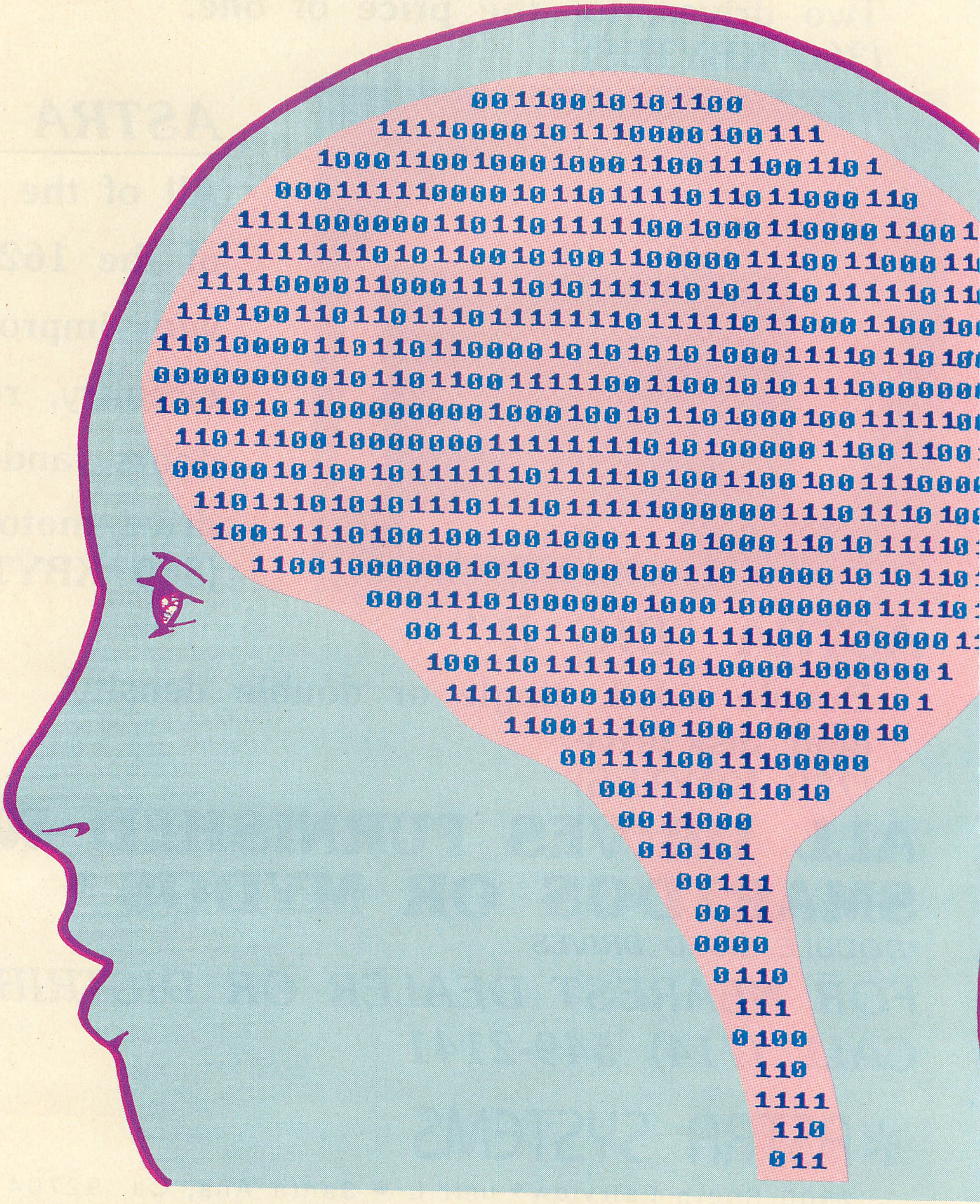
Strope said that many hobbyists are using a round robot platform with two unidirectional casters and two bidirectional wheels, all arranged in a square. If one wheel is on and the other off, the platform rotates. If both are moving constantly, the robot moves foward, etc.

And so the robot revolution rolls on. It is a young field, with plenty of room for you and your Atari.



EXPERT

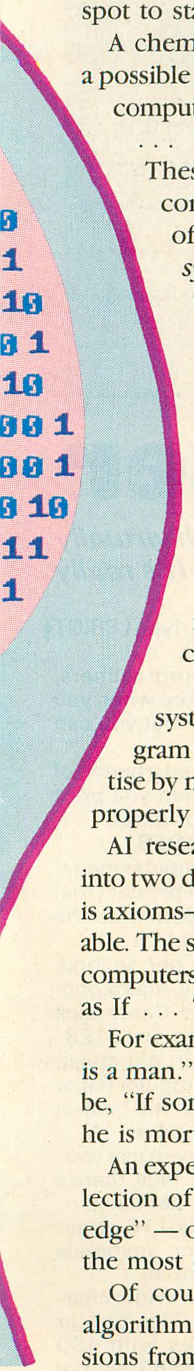
Antic's first look at



SYSTEMS

artificial intelligence

by LARRY LEVITT



A doctor types a patient's symptoms into a computer and gets back a list of possible causes . . .

An oil geologist supplies the computer with site data and is told the best spot to start drilling . . .

A chemist *inputs* a description of a possible chemical pollutant and the computer identifies the compound . . .

These are some of the more common real-world examples of how computers use *expert systems* software to effectively perform research analysis that could once only be done by highly trained human technical experts.

Expert systems are one of the three areas of artificial intelligence (AI) research. The other two categories are robotics and natural language communication.

The idea behind expert systems is that a computer program can simulate human expertise by manipulating large stores of properly arranged knowledge.

AI researchers divide knowledge into two distinct types. The first type is axioms—facts accepted as indisputable. The second type is rules—which computers have traditionally handled as If . . . Then statements.

For example, a fact might "Socrates is a man." And a relevant rule might be, "If someone is a man . . . Then he is mortal."

An expert system is primarily a collection of such snatches of "knowledge" — often over 1,000 of them in the most complex systems.

Of course, what's needed is an algorithm that forms correct conclusions from these bits of knowledge. AI researchers call this part of the system an "inference engine," or *shell.*

Shells are generally written in the language LISP (LISt Processing), mainly because of its ease in defining recursive functions and its powerful manipulation of symbols.

However, LISP programs are extremely slow. So most expert systems are run on dedicated "LISP machines" which are large minicomputers devoted solely to interpreting LISP programs.

Shells normally use either "forward-chaining" or "backward-chaining" techniques to generate conclusions. Forward-chaining means that the system begins with the axioms and rules, then reviews conclusions—much like one might prove a theorem in geometry. A backward-chaining system begins with a hypothesis to be proved, and then proceeds to determine what the system must know in order to prove it.

Stand-alone shells, or "knowledge engineering tools," have attracted recent commercial interest. Users buy just the shell and then compile the knowledge base themselves.

This opens up the market substantially. Knowledge engineers (as programmers in the field are called) can develop widely applicable shells, instead of designing complete systems which might be only useful to a few highly specialized users.

SRI International of Palo Alto is currently selling a $20,000 expert system shell called Series, for the IBM PC XT. The system was developed in a garage by Ray Weinstock, who was subsequently hired on at SRI.

Puff is a medical diagnosis system for respiratory ailments. Written in BASIC, the system has only about 100 rules in its knowledge base.

The best seller among microcomputer expert systems to date is Human Edge's line of software that provides psychological advice on the best way to negotiate business and personal dealings. These programs sell for a few hundred dollars each. According to Fortune magazine, Human Edge grossed $1.8 million from sales of 10,000 programs in the first half of 1984.

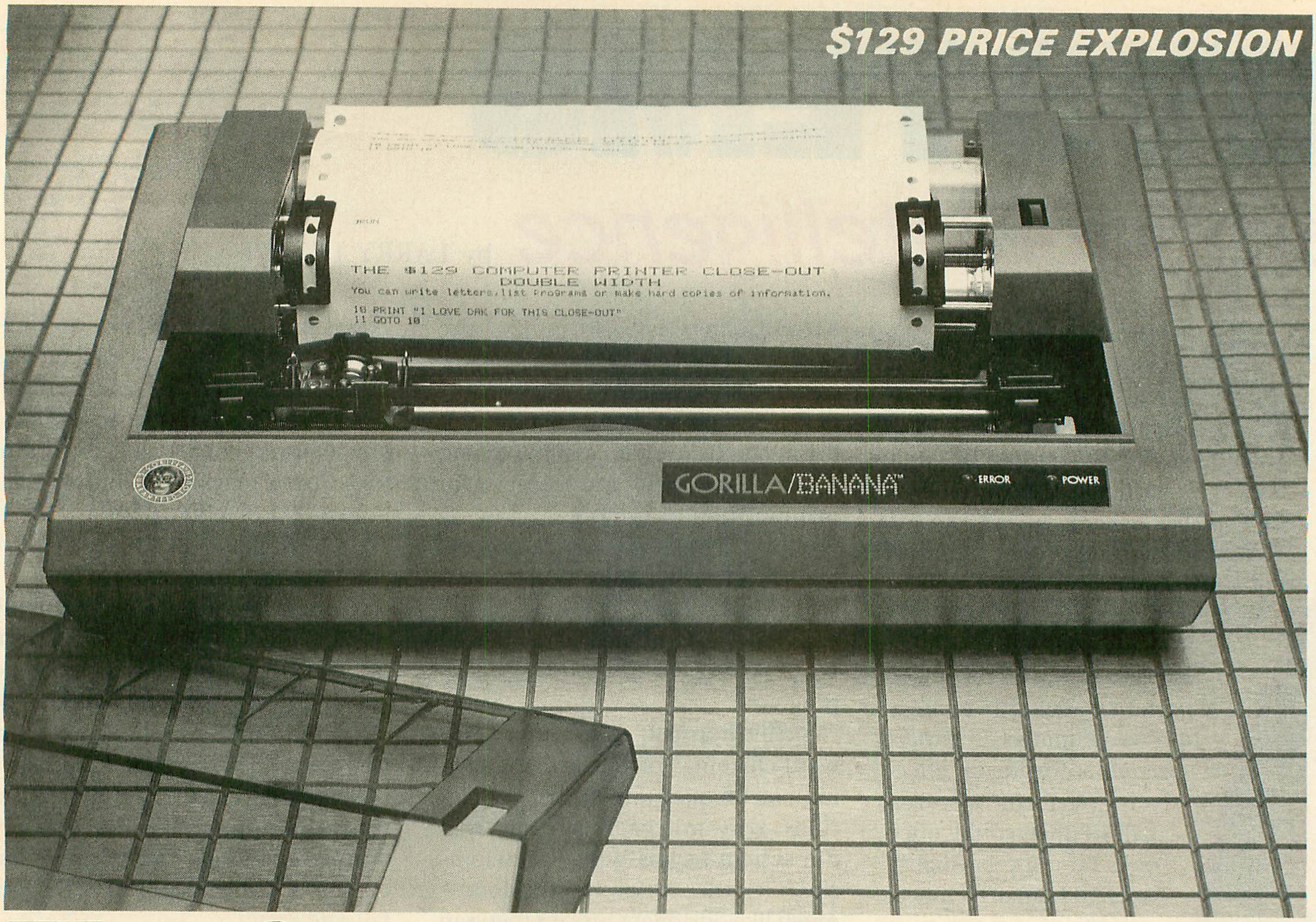
Current expert systems primarily rely on simple symbolic manipulations of rules and facts. There is no attempt to have the software examine causality—WHY a particular conclusion seems to be true. The danger here is that rules could be applied incorrectly, leading to faulty or possibly disastrous results. Simple human common sense is still needed as a fail-safe.

Even users of today's large over-1,000-rules expert systems have a hard time seeing how a particular decision was arrived at. There have been attempts to address this problem. Some systems attempt to explain the process they are going through. Incidentally, most expert systems use some sort of natural language interface, meaning that they appear conversational.

The discipline of artificial intelligence is still in its infancy. But even today's comparatively simple applications based on simple programming techniques are breaking new ground and achieving highly promising results.

Larry Levitt is a student at Harvard's Kennedy School of Government. His primary interest is the field of science, technology and society.

Antic is actively seeking more information, programs and articles which might help our readers understand the new field of artifical intelligence. We believe AI represents one of the most exciting computer frontiers, and we will continue to explore this new field.



The Complete Computer

Here's a 50 character per second, plain paper, dot matrix printer that you can use with virtually any home or office personal computer. It's built really tough to withstand heavy use. It's really easy to use. And, it even prints graphics. Price Slashed to $129.

By Drew Kaplan

Complete your computer. Now you can harness the full power of your computer. From writing letters to listing programs, your computer will be incredibly more useful.

It uses **plain paper** and it's super reliable. It prints both upper and lower case characters. And, if you aren't using a printer with your computer, read on.

LISTING/INDEXES/LETTERS AND MORE

Experience the thrill of actually writing your letters and reports on your computer. Now you'll be able to use all of your computer's word processing and **correcting** capabilities to really explore your creative talents.

It's easy. Some of the new word processing programs are so 'user friendly' that you can learn to use them in just about 10 minutes. Change a line, change a word, move a line. Just push a button.

Are data bases a four letter word? Not on your life. Now you can use your computer to organize all your telephone numbers, your stocks, stamps, and recipes.

If you're using your computer for business, you can have a complete, instantly accessible file for each customer by name, what they bought, when, etc.

A data base will let you find or organize and print out any information you want, however you want, whenever you want.

There's no more complicated programming required. And, inexpensive data base programs are availible at any computer store.

PERMANENT RECORD

If you have a modem, you're in for a treat. You can access encyclopedias, stock market reports, and much more. When you sign on a service like Com puServe or The Source, the world is quite literally at your finger tips.

With a printer, you can get a 'hard copy' of all the incoming information. You can get everything from SAT test simulations and IQ tests to loan amortization schedules.

AFRAID OF PROGRAMMING?

You don't need to know the first thing about programming to use this or any printer. But, if you've never typed in and run a program, here's the easiest one I know. Turn on your computer.

Commodore Owners, and Atari Owners, your computer, and most others will say 'Ready'. Just push Control and Reset on an Apple. Then type the following:

```
10 PRINT "DAK IS WONDERFUL"
20 GOTO 10
RUN
```

You should type a carriage return at the end of each line. Why not try this program now? Next time, I'll tell you how to get out of the program, and maybe even discuss peeks and pokes.

If the program isn't running, type LPRINT instead of PRINT in line 10.

To you sophisticated programmers, think how easy your life will be when you can print out program lists that you can study at length.

And, you won't have to load a bunch of disks to find a program when you print out a menu for each of your disks.

LOOK AT ALL IT DOES

An ad in several August computer magazines listed a $149 thermal printer (that needs expensive thermal paper) as the lowest priced printer in the U.S.

Imagine a 50 character per second, plain paper, full 80 column dot, matrix printer with a built-in standard Centronics Parallel Interface, slashed to just $129.

This printer handles plain old cheap standard fanfold pin feed computer paper from 4.5" to 9.5" wide, with it's built-in adjustable tractor pin feed drive.

It's so powerful you can even use two-part forms for a carbon copy. Plus, there's an impact control for print darkness.

It understands and prints 116 upper and lower case characters, numerals and symbols. And that's not all.

You can even print Double Width characters. **And, look at this.** This printer has full graphic capabilities with 480 dot horizontal resolution and 63 dot per inch vertical resolution. So, you can print out your pictures, pie charts or graphs.

It prints 10 characters to the inch, six lines to the inch. In short, it's going to make typewriters into dinosaurs. When hooked to your computer, you'll never have to retype anything again. If you find an error, just make the correction and let the computer retype your work for you.

The printer is made by C.ITOH/Leading Edge in Japan. It's built to really take heavy use. But in the unlikely event that it should need service, there are approximately 400 service centers nation wide.

It takes standard long life inked ribbon cassettes that are readily available nation-wide. This is a printer that will give you many years of continuous reliable service and enjoyment.

AND NOW THE BAD NEWS

If you're the president of a large company sending important business letters, you may want a $1000 daisy wheel printer. But for most uses, dot matrix printers are incredibly faster, and there isn't any way to print out a graph or picture on a daisy wheel printer.

But, there are two things you need to know about this printer. First, it has about the dumbest name I've ever seen. It's built tough and rugged. So, they named it The Gorilla Banana Printer.

Second, like many dot matrix printers, the letters g, j, p, q, and y are level with the other letters. Each letter is completely and perfectly formed, but each sits level with the rest of the alphabet.

Upper case letters and symbols are unaffected. So, if you don't want letters that look like they were printed by a computer, this printer isn't for you.

But for most letters, term papers or reports, programming and all the data bases and information you'll get through a modem, this printer is perfect.

COMPATIBLE COMPUTERS

Any Computer with a standard Centronics parallel port, such as: **Apple, Franklin, IBM PC, TRS80, Osborn, Atari, Commodore VIC 20, Commodore 64, Kaypro, and virtually any other personal computer. Plus, most briefcase portables.**

FEAR OF INTERFACES?

Your computer is smart. But, it doesn't know how to 'talk' to other devices. That's why you need an interface.

An interface isn't just a cable. It's actually an intelligent translator that lets your computer talk to other equipment.

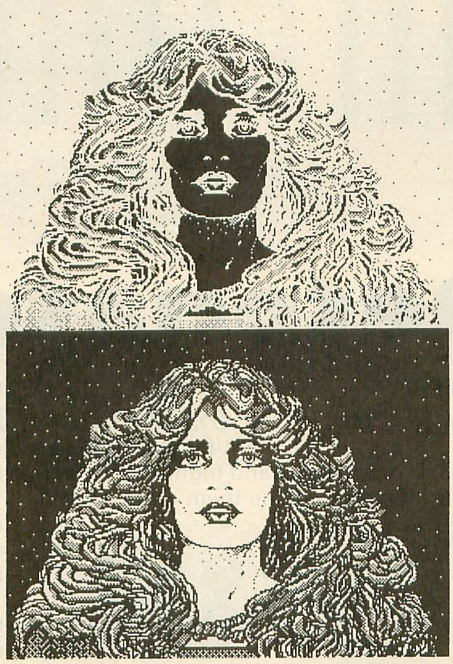
Usually the computer manufacturers don't include the various interfaces when you buy your computer, because they don't know if you'll ever add peripherals such as disk drives, printers or modems.

So, rather than sell you something you don't need, you don't buy an interface untill you add onto your computer.

There are two types of printer interfaces. The first allows you to do text word processing. For 99% of computer use, this is all that is needed. It translates all the possible letters and punctuation known as ASCII. This printer understands 116 characters and symbols.

A second type of interface **also** allows you to dump pictures or graphics from your screen or memory. This is more complicated because every dot must be told where to go. This interface, or 'driver program' as it is called, is available in two forms; built into an interface card, or as a program on a disk which you use in conjunction with any standard interface.

Either way, you'll have the printer operating in just a few minutes. And if you already have a printer, the same Centronics parallel interface and cable (about 85% of all printers are compatible) should work with this printer.



With this printer you can alter your graphics as you desire. You can print normal or reversed (both shown above, reduced to fit in this catalog) and you can even print double size.

WHY SO CHEAP

A new model will emerge soon with a different name. Leading Edge had just 28,000 of these remarkable printers which have been selling at discount for as little as $199, left in stock.

DAK bought them all for cold hard cash. And now we're offering them to you for less than the original price we were quoted as wholesale.

The printer is approximately 16½" wide, 9" deep and 7" tall. It's backed by Leading Edge's standard limited warranty.

ADD PRINTING POWER TO YOUR COMPUTER RISK FREE

Now you can really make use of your computer. 50 characters per second printing on plain paper for just $129. Wow!

Now you can print out your programs, your notes or your letters. If you're not 100% satisfied, simply return the printer and any accessories in their original boxes to DAK within 30 days for a refund.

To order your 50 Character Per Second Dot Matrix, Plain Paper Printer with a built-in Centronics Parallel Interface, risk free with your credit card, call toll free, or send your check for the breakthrough close-out price of just **$129** plus **$8** for postage and handling to DAK. Order No. 4101. CA res add 6% sales tax.

Special Note: If you need a serial printer for a computer, such as the TRS80 Color Computer, order the identical printer with a built-in Serial Interface for the same price. Use Order No. 4102.

The Printer comes packaged with a long life ribbon. Extra ribbons are available at computer stores. DAK has them for **$4** each ($1 P&H) Order No. 4103.

Standard Centronics Interfaces for your computer are available at any computer store. This Printer has its receiving interface built in. You simply need one, complete with its cable, to plug into your computer 'to send' information. Below are our favorites for 5 of the most popular computers.

For your Apple. We have Practical Peripherals' text interface for just **$49** ($2 P&H) Order No. 9877. We have their graphics capable interface for just **$79** ($2 P&H) Order No. 4104. If you already have a Centronics Parallel Interface, we have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4105.

For your IBM PC, you don't need an interface. It's usually already built-in. But, you do need a cable. We have a cable, ready to connect this printer to your computer, for just **$19** ($2 P&H) Order No. 9879. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4106.

For your Atari 800, 800XL, 400, or 600XL, we have a text interface for just **$69** ($2 P&H) Order No. 9881. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4107.

For your Commodore VIC 20 or 64, we have a text interface for just **$39** ($2 P&H) Order No. 9883. We have a Graphics Interface for just **$54** ($2 P&H) Order No. 4108.

Special Bonus for Commodore 64 owners. We have a powerful word processing program with editing, including changing a line, a word, or moving a line. Once you've tried computer word processing, you'll never want to look at a typewriter again.

Plus, we have a super data base program that lets you use 8 fields of information on up to 200 subjects at a time. Then you can search for any part, sort alphabetically or numerically and print out an address book, a list of your stocks or anything you can imagine. They're both yours for just **$5** ($1 P&H) with purchase of the printer. Use Order No. 4122 for Disk, or Order No. 4123 for Cassette.

For most TRS 80 Computers, you don't need an interface, just a cable. For the Black and White Computers, we have a Parallel Cable for just **$18** ($2 P&H) Order No. 9885. For the Color Computers we have a Serial Cable (you need the Serial Printer as well) for just **$18** ($2 P&H) Order No. 4109.

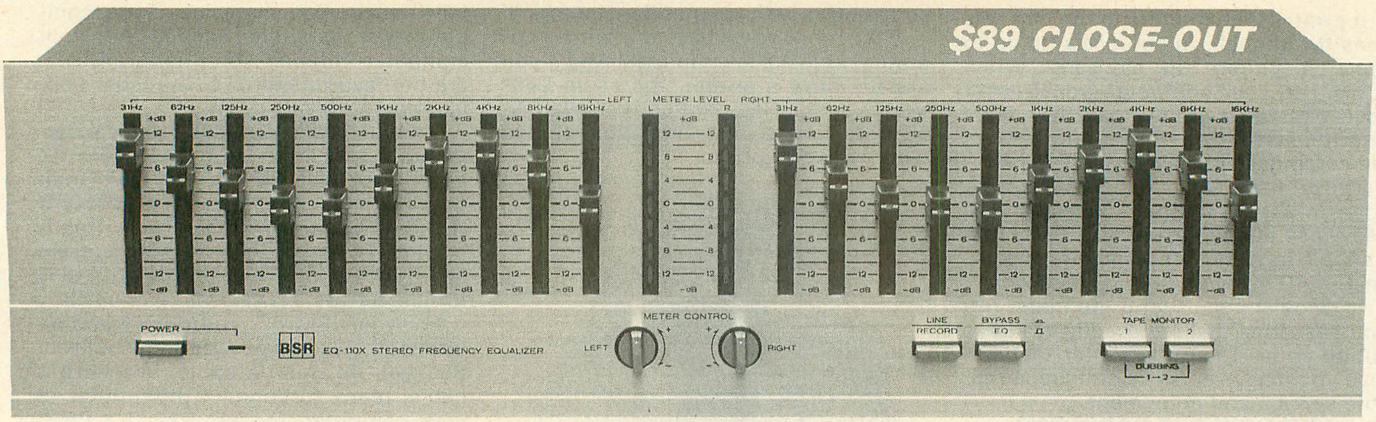
For **briefcase-type** portables, the Centronics Interface is usually built-in. Just stop by any computer store. All Centronics Printers use the same cable at the printer end, but you'll need a cable that fits your particular computer's plug.

Get hard copy print-outs of your programs or your graphics. Turn your computer into a powerful word processor. Forget retyping ever again. For just $129 you can make your computer complete.

Dept. AN01

DAK
INDUSTRIES INCORPORATED

TOLL-FREE ORDER LINE
For credit card orders call 24 hours a day 7 days a week
CALL TOLL-FREE. . .1-800-325-0800
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Sound Detonator Plus

Make your stereo system's sound explode with life. Improve the sound quality by 30 to 50%. Plus, you'll add tape dubbing too with this limited BSR $89 close-out.

It's like night and day. Crashing cymbals, the depth of a string bass, more trumpets or more voice will come bursting forth from your stereo at your command.

You'll make your music so vibrant that it will virtually knock your socks off when you use this professional quality 10 band stereo Sound Detonator Plus Equalizer.

It has a frequency response from 5hz to 100,000hz ± 1 db. BSR, the ADC equalizer people, make this super equalizer and back it with a 2 year limited warranty. Our $89 close-out price is just a fraction of its true $249 retail value.

CAN YOUR STEREO SOUND BETTER?

Incredibly better. Equalizers are different from regular bass and treble controls. And, 10 band EQs are the best.

Bass controls turn up the entire low end as well as the low mid-range, making the sound muddy and heavy. With an equalizer, you simply pick the exact frequencies you want to enhance.

You can boost the low-bass at 31 hz, 62hz and/or 125hz, and the mid-bass at 250hz and 500hz to animate specific areas of the musical spectrum.

And, when you boost the part of the bass you like, you don't disturb the mid-range frequencies and make your favorite singer sound like he has a sore throat.

The high frequencies really determine the clarity and brilliance of your music.

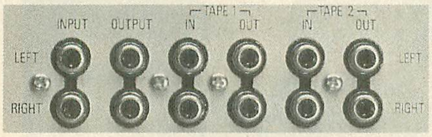
You can boost the mid-range and highs at 1,000hz, 2,000hz, 4,000hz, 8,000hz and 16,000hz. So, you can bring crashing cymbals to life at 16,000hz while at the same time you cut tape hiss or annoying record scratches at 8000hz.

You can also boost or cut specific mid-range frequency areas to add or subtract vocal, trumpets, guitars or whatever instrument ranges you prefer.

GREAT FOR 2 TAPE DECKS

You can push a button and transfer all the equalization power to the inputs of two tape decks. So, if you have a cassette deck in your car or a personal stereo that you wear, now you can pre-equalize your cassettes as you record them.

Now you can get all the dramatically enhanced sound wherever you are. This is an especially great feature for bass starved portables and high-end starved car stereos to make them come alive.



And, look at this. There are two tape inputs and outputs, so you can dub from tape deck A to B, or make two tapes at once with or without equalization.

EASY HOOK UP

Use your tape monitor circuit, but don't lose it. Now your one tape monitor circuit lets you connect two tape decks.

Just plug the equalizer into the tape 'in' and 'out' jacks on your receiver. We even supply the cables.

As you listen to your records, FM or 'aux', any time you push the tape monitor switch on your receiver you'll hear your music jump to life.

The output from your receiver is always fed directly to your tape decks for recording, and with the touch of a button, you can choose to send equalized or non-equalized signal to your recorders.

When you want to listen to a tape deck, just press a tape monitor button on the equalizer and your tape deck will work **exactly** as it did before. Except, that now you can choose to listen with or without equalization and you can dub.

You won't be listening to any distortion or hum. The Sound Detonator Plus has a 95db signal to noise ratio and total harmonic distortion of just 0.018%

Once you've set your equalizer controls, switch it in and out of the system. You'll hear such an explosive improvement in sound, you'll think you've added thousands of dollars of new equipment.

WHY A CLOSE-OUT?

Last year DAK closed out over 18,000 of BSR's 7 band equalizers because BSR had decided to only sell equalizers under their ADC name and they still had some left with the BSR name on them.

Well, as Detroit comes out with new cars each year, ADC comes out with new equalizers. We got them to supply us with just 15,000 of last year's model before they shut down for the new one.

They had already paid for all the tooling, all the research and design, so we were able to buy these for less than half the normal price, for cold hard cash.

So, you can go to any HiFi store and buy this year's design in an ADC equalizer made by the parent company BSR, or you can get this $249 value BSR equalizer while our limited supply lasts, for $89.

THE FINAL FACTS

There are 20 slide controls, each with a bright LED to clearly show its position. Each control will add or subtract up to 12db. (That's a 24db range!)

There are separate sound detonation slide controls for each channel at 31 hz, 62hz, 125hz, 250hz, 500hz, 1,000hz, 2000hz, 4000hz, 8000hz, and 16,000hz.

LED VU meters with ± 0.5db accuracy show levels for each channel. It is 17" wide, 6½" deep and 4½" tall.

PUT LIFE INTO YOUR MUSIC RISK FREE

Prepare for a shock the first time you switch in this equalizer. Instruments you never heard in your music will emerge and bring a lifelike sound that will envelop you and revolutionize your stereo system.

If your system doesn't spring to life, simply return the equalizer within 30 days in its original box for a refund.

To order your Sound Detonator Plus Tape Dubbing BSR 110X10 Band Stereo Frequency Equalizer risk free with your credit card, call toll free or send your check not for ADC's $249 value, but for only **$89** plus **$7** for postage and handling. Order No. 9724. CA res add 6% tax.

Wake up the sound in your stereo. Your sound will explode with life as you detonate each frequency band with new musical life. And now you'll be in control of two tape decks as an added plus.

Dept. AN02

DAK
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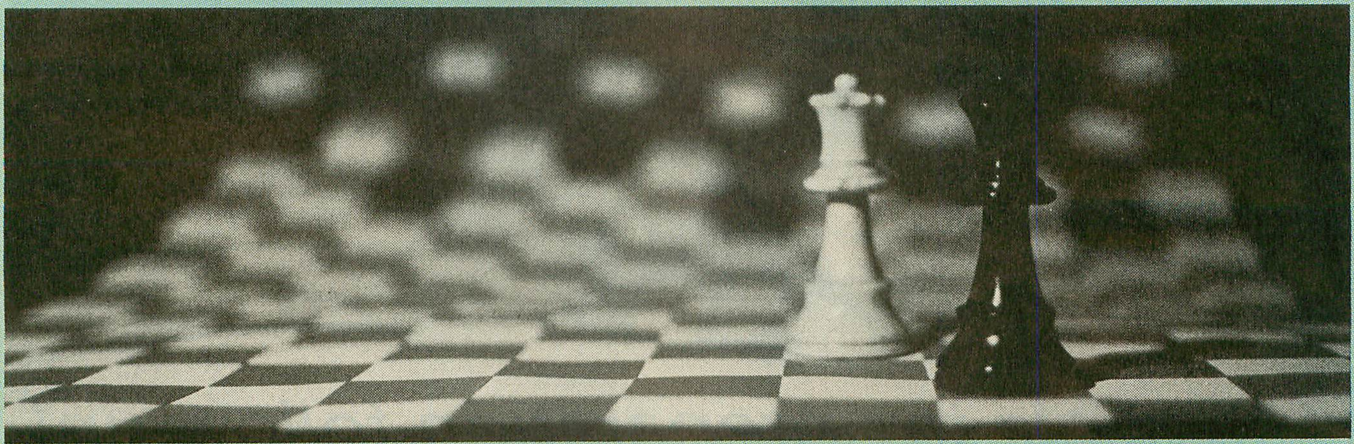
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For credit card orders call 24 hours a day 7 days a week
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ADVERTISEMENT

THE EIGHT QUEENS PROBLEM

Your Atari's brute-strength solution!

by ANGELO GIAMBRA



The brute force of computer power is used to solve a complicated chess problem in this BASIC program. Works on all Atari computers with 24K memory for cassette, or 32K for disk.

Antic challenges you to solve the well-known Eight Queens Chess Problem: You must arrange eight queens on a chessboard so that none of them threatens another!

(In case you are unfamiliar with chess, the queen is the most powerful piece on the board. It can attack at any distance along a horizontal, vertical, or diagonal line.)

Done yet? No? You didn't find all 92 solutions? It shouldn't have taken more than a few hours to find at least three solutions.

But maybe you said to yourself, "I'd be stupid to beat my brains out on this. My Atari should be able to figure it out." You were right. This is exactly the kind of problem suitable for solution by computer.

LINDA TAPSCOTT

BRUTE COMPUTING

The Eight Queens Problem demonstrates your computer's impressive brute number-crunching trial and error capability. It systematically tries every possible combination until it arrives at a solution.

To access this brute force, type in listing 1, check it with TYPO II, and SAVE it to disk or cassette.

When you RUN the program, it will first ask you to enter a starting position. Key in any number from one to eight. The computer will draw a chessboard on your screen and place a queen in the square in the top row corresponding to the position you entered. It will then proceed to place queens in other squares in an attempt to solve the problem.

WATCH IT WORK

You'll be able to watch as the computer tries combinations, then backs out of the moves that do not work.

Finally, when it finds one of the solutions, the screen will flash and the program will display the message PRESS ANY KEY. Press any key and the computer will begin searching for the next solution.

Your computer may seem to be randomly trying squares, but it is actually proceeding in an orderly fashion and will not come up with the same solution twice.

Though this application may seem trivial, computers are often used in just this fashion to solve real-life problems.

For example, some trucking firms employ software to find the most efficient route between several cities. Using the the same brute force method, these programs calculate the mileage of all possible routes, determine the number of stops needed for each alternative, and then choose the best route.

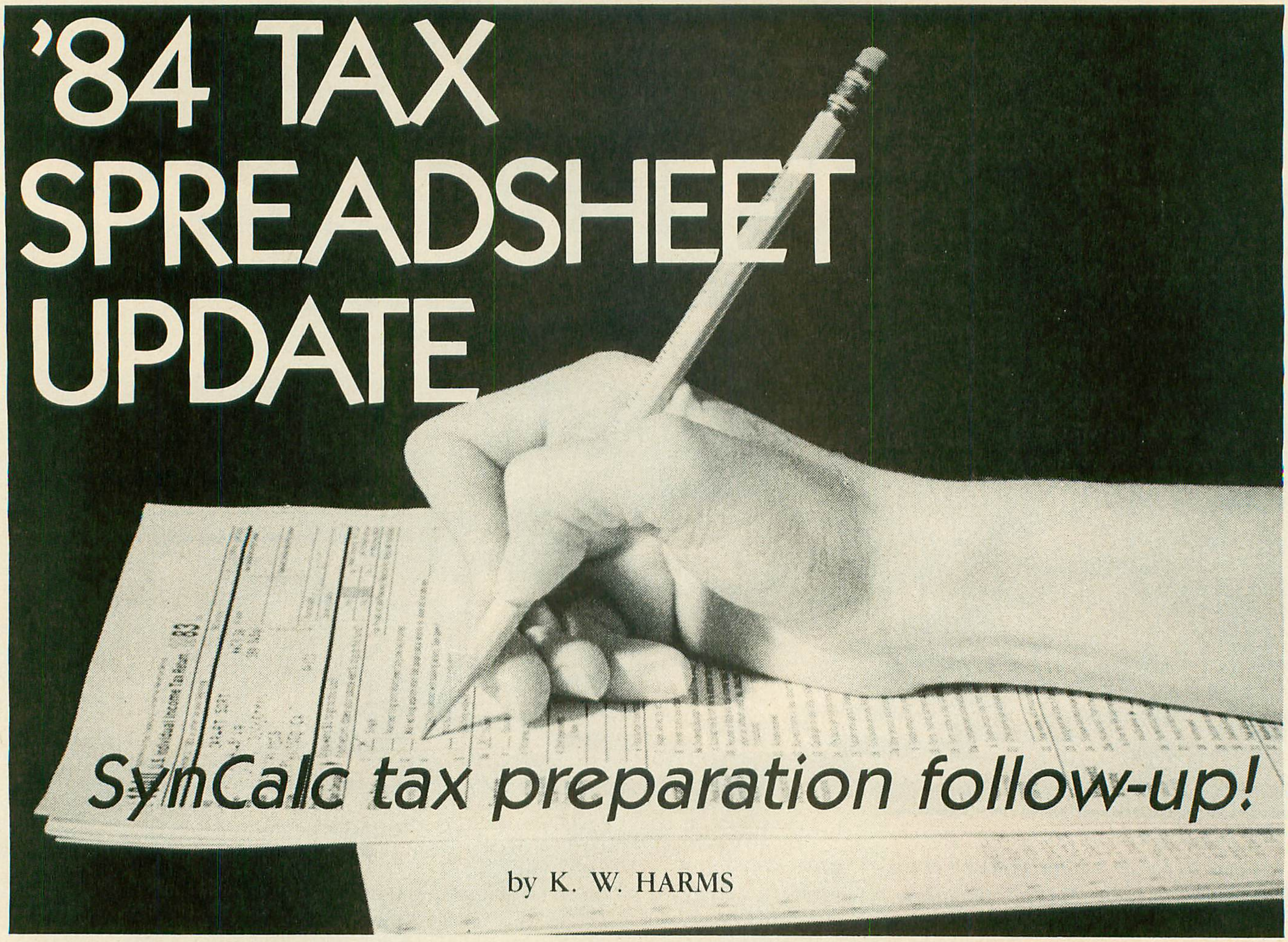
MORE UNIQUE

Incidentally, only 12 of the 92 solutions are unique. Some solutions duplicate others if you rotate the chessboard. This program doesn't attempt to isolate the unique solutions.

For a real challenge, you might want to try modifying the program so that only unique solutions are found. Now there's a real challenge.

Angelo Giambra is a technical analyst from Buffalo, New York who normally deals with mainframes in COBOL and ALGOL. He describes himself as "an avid Atari hobbyist."

Listing on page 62.



'84 TAX SPREADSHEET UPDATE

SynCalc tax preparation follow-up!

by K. W. HARMS

LINDA TAPSCOTT

This is the promised 1984 IRS-revision update to the SynCalc template for Federal income tax preparation which appeared in the February, 1985 ***Antic****. You need a 48K Atari, disk, SynCalc software and the previous template.*

Unfortunately, the IRS did not forget to issue the 1984 income tax forms, so here are the changes you'll need for your **SynCalc** 1040 Federal Long Form personal tax template.

To use these tax template updates, you need to have correctly typed in the preliminary tax template from the February **Antic**. The changes you must now make should take about an hour to enter.

However, you can get the entire corrected 1984 template on disk—complete with 6 additional schedules that don't appear in the printed version. The cost is $15 and it's tax deductible. And for just $65 you can get both the tax template and SynCalc. See the order form in this issue.

Note to Antic Disk subscribers: These changes are on your monthly disk. They will load from SynCalc like any other data file. Follow the directions in your SynCalc manual for replacing earlier cells.

Please refer to the prior article for detailed instructions on entering SynCalc data. Since the steps below affect cell addresses, they must be followed in the order given. Start at cell A1 and work down. Many of the changes are descriptive text such as form line numbers, so they aren't critical. The formulae, however, MUST be typed in exactly as given.

And you definitely should have the 1984 IRS tax instructions at hand when you check the template results. Antic Publishing and the author must disclaim responsibility for any mistakes that might be made in your tax payments as a result of using this template.

THE 1040

The 1040 is changed little for 1984. First, go to cell A1 and DELETE ROW. Go to cell A2 and change 1983 to 1984. Go to cell A28 and INSERT ROW. Use a quote sign to start a text cell, and enter the line number 21 in cell A28 and TAXABLE SOCIAL SECURITY in cell B28; enter a zero in cell E28.

From cell A29 (Other Income) through cell A37 (Sched W)., each form line number is increased by one (the 21 in cell A29 becomes 22, etc.) Go to cell A38 and DELETE ROW the Disability Exclusion. Since that action leaves cell E38 filled with ?????, we know a formula is needed; enter @SUM(E37:E31). (You may find that cell protected. If so, unprotect it with /FUO and enter again. I suggest protecting all formulae with the ENTRY or OVERRIDE option; use the /FO command.)

Go to cell A48 and change the 41/44 to 41. Change the Tax Credits description in cell B48 to read CARE CRED 2442 and enter the formula +E239 in cell D48. Cell A49 should be changed to read 42/45 PERSONAL

CRED and a zero entered in D49.

In E49 enter +D49+D48. Change cell A50 to read 46 NET TAX CRED and ERASE (/E) any values in D50. Enter @IF E47-E490 THEN E47-E49 ELSE 0 in cell E50 and format it dollars (/F$). Cell A51 gets the description 47-49 BUSINESS CREDITS, cell D51 is erased and cell E51 gets a zero.

With the cursor on cell A52, INSERT ROW. Enter 50 NET TAX+CRED in the new cell A52 and the formula @IF E50-E51>0 THEN E50-E51 ELSE 0 in cell E52; format it dollars. Cell A53 gets changed to read 51 and A54 to read 52/55. Enter a new formula in cell E55, it's now +E54+E53+E52. Change the 83 in cell B57 to read 84.

Next, we change the tables. If you want to use only one table, it's okay to change only that one. But, if you do, be sure to do the ROW INSERTs for all, so that the rest of the changes will work correctly.

THE TAX TABLES

Table X changed substantially this year. Go to cell A80 and ROW INSERT two rows, then enter the table as listed (FORMAT PRECISION 2 cells C80 and C81). Cell E68 contains the first of six formulae which LOOKUP tax amounts. Every reference to cell A79 in these formulae must be changed to A81 in each of the formulae (E68, and E71 through E75) since we increased the table size.

The two Y Tables and Table Z each added one line and changed only the percentages in column C. Go to cell A97 and INSERT ROW. Then enter Table Y, Married. Change references to A96 to read A97 in all LOOKUPS in formulae in cell E86 and E88 through E92.

Table Y, Separate, is similar. Goto cell A113 and INSERT ROW, enter table changes and change references to A112 in LOOKUPs in cell E102 and E104 through E108 to be A113. With that practice, you'll find Table Z easy. Go to cell A129 and INSERT ROW; enter table, change references to A128 to read A129 in all LOOKUPs in formulae in cell E118 and E120 through E124.

SCHEDULES A & B

Schedule A's big change is handling of medical deductions. It was simplified just a bit. Go to cell D132, unformat the dollar sign and erase the zero. Format dollar and enter a zero in cell E132. Change cell A133 to read 2a and cell B133 to read DR, DDS, ETC., ERASE the formula in cell D133 and enter a zero in cell E133. Cell A134 gets 2b TRANSPORTATION, cell A135 should read 2c OTHER, cell A136 2c, cell A137 2c, cell A138 3, cell A139 4, and cell A140 5. Change the formula in cell E138 to read @SUM(E137:E132). and give it a dollar format.

For the rest of Schedule A, reduce label 8 in cell A142 for Taxes should read 6. Change labels in cells A142 A170 which have line numbers. You could add a reference to line 34a to the label in cell B170, Total. Go to cell E40 and be sure it contains the formula +E170

SCHEDULE B

The All Savers fandango of last year is gone, greatly simplifying the interest income section of Schedule B. DELETE ROW to get rid of rows 177 through 184. Be careful because SynCalc renumbers remaining rows as it goes. You should NOT delete the row reading TOTAL INTEREST, which should now be making its home on row 177.

Change cell A177 to read 3, and enter the formula @SUM(E176:E173) in cell E177. Cells A179 through A187 have the form line number decreased by five (form line 9 in cell A179 becomes 4, etc.). ERASE the formula in E185. Go to cell A186 and INSERT ROW. B186 should read SUBTOTAL, enter a formula in D186: @SUM (D185:D183). Cell A187 gets an improved description: TOTAL 1040, LINE 9 and the formula in cell E187 must be E182-D186. Last, go to cell D15 and make sure it has the formula +E187.

INCOME AVERAGING

I never tried income averaging because it was a lot of work. With this template, however, you enter fewer than a half-dozen numbers and the Atari takes over! Unfortunately, the IRS changed Schedule G quite a bit for 1984. It's simpler but it's different. I suggest re-entering the entire Schedule G as printed in this issue and entering all the formulae in their proper cells. When that's done, just DELETE ROW the left over rows so that Form 2441 begins on row 216.

The final Schedule G steps are to change references in the rest of the spreadsheet. Cell D45 shows the Schedule G result in the 1040. It MUST contain the formula +E215. More involved is changing the tax references.

Each Tax Table (X, Y, Z) computes taxes for five lines on Schedule G. Each of these line numbers changed, of course, THEY planned it that way. So go to cell D71; in this and in the other three tables, the labels should be changed by deducting four from the line reference (line 23 becomes line 19, line 21 changes to line 17, etc., for all five lines). Likewise, the cells upon which calculations are based changed. For each of the four tables, the formulae change as follows:

New Line #	Old Cell	New Cell
19	E205	E207
17	E203	E205
16	E202	E204
8	E194	E196
10	E196	E198

For instance, the formula in cell E71 refers to E205 four times. All of these should be changed to E207. This repeats for each line and for each Tax Table. It goes quite quickly after you do the first one.

FORM 2441

The credit for child care was also simplified. First change labels referring to 82 and 83 to name 83 and 84 (cells A232, et. seq.). Then change cell A234 to read 9 TOTAL CREDIT 1040, LN 41. DELETE ROW the remaining four lines (Tax . . . through Deductible). Go to cell D48 in the 1040 and enter the formula +E234.

See the HELP page in this issue for more tips about typing in the tax template.

Listing on page 72



by JOHN SMITH

This BASIC listing turns your Atari into an impressive cryptographic machine. You get menu-driven software that lets you automatically encode and decode secret messages. Runs on all Atari computers of any memory size.

Secret messages fascinate people. Kids like to write to their pals in codes or invisible ink. Diplomats, military men and spies disguise important communications behind ciphers. Secret messages give a rare feeling of privacy to our communications. We can enjoy sharing secrets with friends and fellow insiders, excluding the rest of the world.

For a more immediate practical use, this program can ensure the privacy of computer messages you leave for friends on bulletin boards or electronic mail services. One of the things Secret Agent will do is convert existing disk or cassette text files into secret code.

WHAT IT DOES

Suppose you want to send this order to the commander of your fleet:

ATTACK PEARL HARBOR AT DAWN!

You have previously agreed on a secret keyword: HONDA. You enter your keyword, which can include 25 characters. Then you enter your message, up to 2,000 characters long. For the message and keyword, you can use capital letters, numbers and punctuation marks. But the program can't accept lower case, inverse video or Atari control characters.

Secret Agent automatically encodes the text and writes it to your choice of screen, printer, disk, or cassette. The cipher for our sample message would read:

[N-,JIX4(NG$%3QG$V' &N-3MG)'4]

To decode the message, your fleet commander enters the keyword "HONDA" and the encoded text. Secret Agent prints out the original message.

HOW IT WORKS

```
ATTACK PEARL HARBOR AT DAWN!
HONDAHONDAHONDAHONDAHONDAHON
```

As you see in the above example, the secret keyword is written repeatedly beneath the characters of the message.

Essentially, Secret Agent takes the ATASCII number value of a character in the message, adds the ATASCII number value of the next character of the keyword, and prints the ATASCII letter or symbol that matches the resulting total number.

USING THE PROGRAM

Type in Secret Agent, check it with TYPO II, and SAVE a back-up copy. Then RUN it. Secret Agent is menu driven, so you have a clear choice of options at every step. Learning to use the program should only take a few minutes.

Correct errors as you enter your message with the [DELETE] key. End your message by pressing [RETURN]. Notice that the screen automatically supplies square brackets [ ] to mark off each end of your message. Happy secret coding!

John Smith has a fitting name for a cryptographer. Mr. "Smith" claims to live in Plymouth, Michigan.

Listing on page 63

Turn your Atari into a Ferrari.

Introducing the all-new Indus GT™ disk drive. The most advanced, most complete, most handsome disk drive in the world.

A flick of its "Power" switch can turn your Atari into a Ferrari.

Looks like a Ferrari.
The Indus GT is only 2.65" high. But under its front-loading front end is slimline engineering with a distinctive European-Gran flair.

Touch its LED-lit CommandPost™ function control AccuTouch™ buttons. Marvel at how responsive it makes every Atari home computer.

Drives like a Rolls.
Nestled into its soundproofed chassis is the quietest and most powerful disk drive power system money can buy. At top speed, it's virtually unhearable. Whisper quiet.

Flat out, the GT will drive your Atari track-to-track 0-39 in less than one second. And when you shift into SynchroMesh DataTransfer,™ you'll increase your Atari's baud rate an incredible 400%. (Faster than any other Atari system drive.)

And, included as standard equipment, each comes with the exclusive GT DrivingSystem™ of software programs. World-class word processing is a breeze with the GT Estate WordProcessor.™ And your dealer will describe the two additional programs that allow GT owners to accelerate their computer driving skills.

Also, the Indus GT is covered with the GT PortaCase.™ A stylish case that conveniently doubles as a 80-disk storage file.

Parks like a Beetle.
The GT's small, sleek, condensed size makes it easy to park.

So see and test drive the incredible new Indus GT at your nearest computer dealer soon.

The drive will be well worth it.



INDUS™

The all-new Indus GT Disk Drive.

The most advanced, most handsome disk drive in the world.



For additional information, call 818/882-9600.

DOT-MATRIX DIGITIZER

Your printer can digitize photos!

by CHARLES JACKSON & STEVEN CHAPMAN

Turn your dot-matrix printer into a photographic digitizer for a couple of dollars in electronic parts and some surprisingly simple tinkering. The included BASIC program requires an Atari computer with the GTIA chip, and a disk drive.

To test whether your Atari has the GTIA, type in and RUN the following: 10 GRAPHICS 9:GOTO 10. If your screen turns black, you have the correct GTIA chip. If it remains blue, you have the older CTIA chip.

Your dot-matrix printer can digitize photographs. The parts you'll need should cost less than $3. With the accompanying digitizer program, you can create and store beautiful digitized GRAPHICS 9 pictures. Then you can use Scott Berfield's "GTIA Sketchpad" program (**Antic**, December, 1983) to edit and print out your pictures!

To test whether your Atari has the GTIA, type in and RUN the following: 10 GRAPHICS 9:GOTO 10. If your screen turns black, you have the correct GTIA chip. If it remains blue, you have the older CTIA chip.

As written, the digitizer program is for the Gemini 10-X printer. But we'll tell you how to modify the program for other printers.

However, first you must do a bit of easy tinkering. Here's the hardware you'll need:

- TIL414 Infrared phototransistor (Radio Shack 276-145 or equivalent).
- Female joystick port connector (Radio Shack 276-1538 or equivalent).
- BIC-type pen cap.
- 150-watt (at least) light source
- Several feet of cable wire, plus aluminum foil, paper clips and electrical tape.

THE LIGHT SENSOR

Assemble the digitizer circuit as shown in *Figure 1*. If you own an XL computer, bend back the joystick port connector's metal flap or it won't fit.

The pen cap will hold the phototransistor, shielding it from heat and stray light. Cut off a half-inch from the top of the pen cap to form a tube. Slide the phototransistor into the pen cap (push it as far as it will go) and tape the wires to the pen cap's clip.

Seal the back of the pen cap with a small piece of electrical tape to keep out stray light.

Cut a small slit in a piece of electrical tape, and place it over the front of the pen cap. This slit acts like a glare guard for the phototransistor.

Next, take a small piece of aluminum foil, wrap it around the pen cap and tape it in place. The foil prevents stray light from passing through the pen cap to the phototransistor. It also protects the phototransistor from much of the heat generated by your light source. Signs of an overheated phototransistor include random black spots on your digitized picture. Make sure the foil doesn't block the sensor's front slit.

PRINTER ATTACHMENT

Turn off your printer and unplug it. Remove the tractor feed unit and ribbon, and adjust the roller bars to press the paper flat against the platen.

Bend a paper clip into an "L" shape and attach it to the print head screw. (See *Figure 2*.) Tape the light sensor to the paper clip. Position the sensor above the roller bar, at a right angle to the picture and about one-half inch away from it. Tape the sensor's wires to the print head. This will help the sensor stay in place while the print head moves.

DIGITIZING

Type in the digitizing program, check it with TYPO II and SAVE a copy.

Select a large black-and-white photograph with plenty of contrast. Portraits are best to start with.

We found that the digitizer doesn't work well with glossy photographs. So use a photocopy of any glossy picture you want to digitize. The sample digitized illustration with this article was made from a photocopy of an 8" X 10" glossy photo of Sam Tramiel, president of Atari Corp.

The digitizer will process an area measuring up to 5 1/3 inches high by 8 1/4 inches wide. Turn off the power to the printer and insert your picture as you would any piece of paper.

Check the DIP switches on the rear of the Gemini. Switches 1-3 should be turned down and switch 4 should be up.

These switch settings tell the Gemini to ignore the "paper-out" detector, and to print the contents of the buffer and a linefeed every time it receives a carriage return code.

Position your light source above the photograph. Make sure the light sensor will not be "reading" its own shadow.

Bright fluorescent lights are preferable to incandescent lights because they provide an even, glare-free glow which does not radiate much heat. If a fluorescent light is not available, two or more incandescent lights should be used to ensure even lighting.

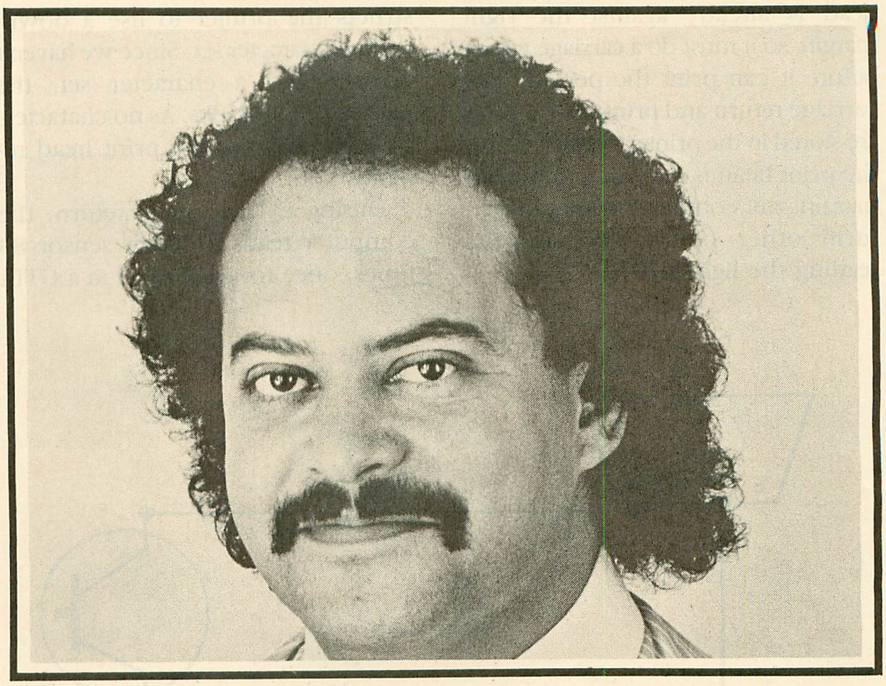
Plug the sensor into joystick port 1 and type in this one-line calibration program:

```
1 PRINT PADDLE(0):SOUND
  0,PADDLE(0),14,14: GOTO 1
```

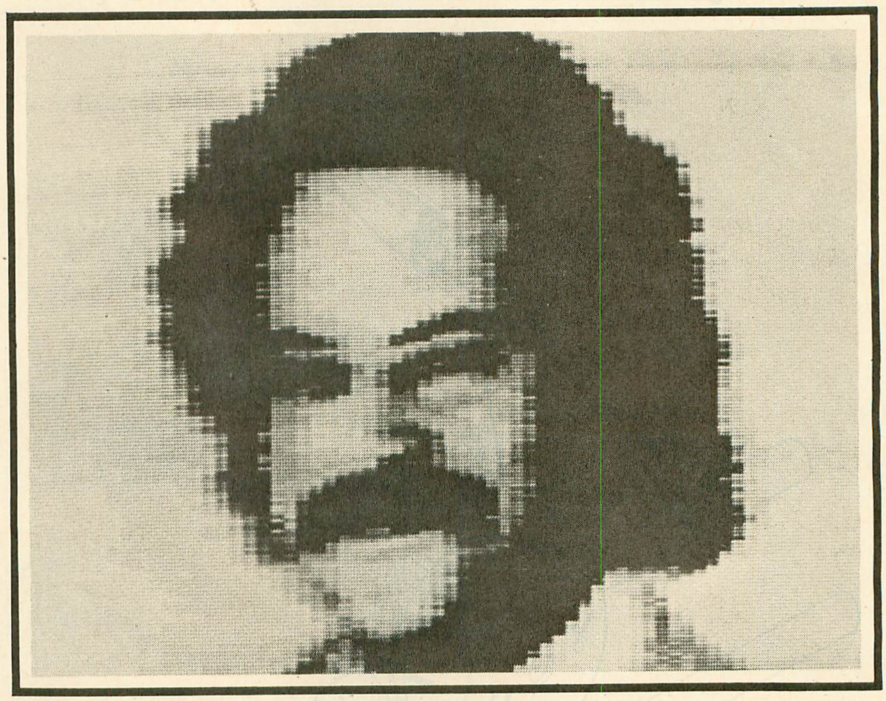
Turn on your light source(s) and type RUN. The program prints light levels onto the screen while generating corresponding sound cues. Light levels range from zero to 228. Low numbers and high tones indicate bright light. High numbers and low tones correspond to dimmer light. Adjust the lights so that white areas of the photograph return high tones and low numbers, while dark areas return low tones and high numbers.

Turn on the printer, LOAD the digitizer program and type RUN. The computer will ask you for the filename under which your completed picture will be stored, and the type of digitizing process to be used. The "High Contrast" option uses a formula which normalizes light levels and increases the program's sensitivity to lighter areas.

The program must calibrate itself before digitizing your photo. The computer will prompt you to put a white screen or card in front of the sensor, then a black screen or card. Once you've calibrated the program, press [RETURN] to begin digitizing



Original photo of Sam Tramiel.



Digitized photo of Sam Tramiel.

and the printhead will move back and forth.

The computer requires 20 minutes to digitize a picture using the "Low Contrast" option. Pictures processed with "High Contrast" require 60 minutes.

After about seven minutes, the screen will change colors and enter the "attract mode" to preserve the life of your picture tube. Press any key when you want to restore the proper colors to your screen.

HOW IT WORKS

Line 190 places the printer in condensed mode (136 characters per line). At line 250, the print head

continued on next page

moves to the last column, advances the paper by 4/144ths of an inch, and tries to print a period. But the print head is already against the right margin, so it must do a carriage return before it can print the period. The carriage return and print instructions are stored in the printer's buffer. While the print head is returning to the left margin, the computer is free to perform other operations, such as reading the light sensor.

Your original picture will not be harmed, because the printer does not actually print a period. Line 170 instructs the printer to use a downloaded character set. Since we haven't downloaded a character set, the printer prints blanks. As no characters are ever printed, the print head remains cool.

During each carriage return, the computer reads the light sensor 80 times; once for each pixel in a GTIA screen scan line. The scanning loop routine lies in lines 260-280. Line 270 is an arithmetical delay which slows down the scanning loop. If this line were omitted, the scanning loop would be completed before the entire line could be scanned, and the digitized picture would be stretched horizontally.

A sound cue has been included to let you know when the computer is reading the light sensor. Use this cue to adjust the duration of the scanning loop when you use the digitizer with other types of printers.

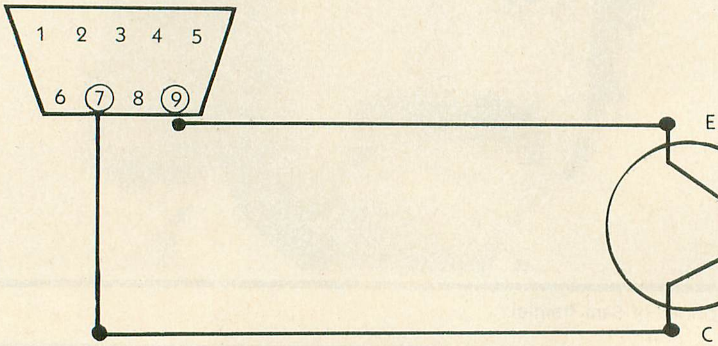


Figure 1

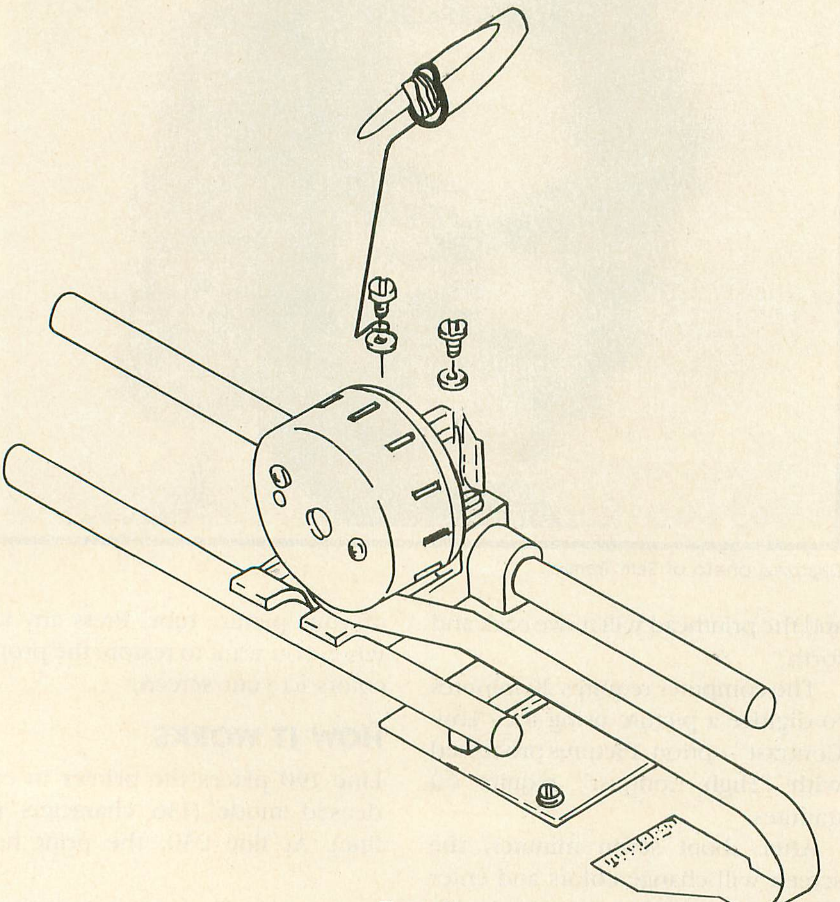


Figure 2

OTHER PRINTERS

To use the digitizer with other printers, you must change the following printer control codes. If your printer has an adequate manual, it will chart the codes that control these functions below:

Line	Purpose
170	Select the download character set.
180	Set the linefeed value to zero.
190	Put the printer in condensed mode.
200	Move the left margin to column one.
210	Ignore the "Paper-Out" detector.
220	Move the print head to the left margin.
250	Move the print head to the right margin, then advance the paper by 4/144 inches.

*Steven Chapman is a design student at UCLA, concentrating on real-world computer graphics applications. He sent **Antic** his highly original method of interfacing a pre-Selectric typewriter as a photo digitizer. When time came for Charles Jackson, our in-house programming specialist, to finalize the digitizer material for publication, he realized that the project would be useful to a lot more readers if it used dot-matrix printers instead. So, with Chapman's conception as a starting point, he built a new interface, reprogrammed the software and wrote a new article.*

Listing on page 69

SPLASH in ACTION!

Demo of Action! vs. Basic

by PAUL CHABOT

A tutorial with four demonstration programs. For BASIC programmers who want to know about the ACTION! programming language, and for ACTION! users who want to pick up some tips. The first BASIC listing will run on any Atari computer. The remaining listings are written in ACTION! and require the ACTION! cartridge. But BASIC programmers can compare these printed listings with the first listing and get some idea why the year-old ACTION! is increasingly becoming the language of choice for serious Atari programmers. NOTE: Antic Disk subscribers can run listing 4 without ACTION! We have provided a runtime binary file. Use the "L" option from DOS for the file, SPLASH.EXE.

If you've used Optimized Systems Software's ACTION! language, then you probably like it as much as I do. If you haven't, read on. ACTION! is virtually as easy to program as BASIC and as powerful as assembly language. The following demonstration programs are intended to show you BASIC hackers why you should seriously consider learning ACTION!

SPLASH IN BASIC

SPLASH1 (listing 1) is a BASIC program that demonstrates artifacting in Graphics 8. It is an extension of a short program on **Antic's** public domain disk GRAPHICS & SOUND #1.

Type in listing 1, check it with TYPO II and SAVE a copy. When you RUN it, use your joystick to choose a point on the GR.8 screen. Pressing the trigger puts a "splash" of lines emanating from this center to all borders. The step size between lines can be changed by simply pressing [S]. The program lets you put as many splashes on the screen as you wish before clearing to start over. It's kind of fun—no violence, no winning score, just pretty. . .

SPLASH IN ACTION!

SPLASH2 (listing 2) is the same program, but in ACTION!. If you look at both listings, it is easy to see which PROCedures correspond to which BASIC subroutines. That's because I made a point of keeping SPLASH2 as structured as possible within the confines of BASIC.

continued on next page

A major advantage of ACTION! is that it is a structured, procedure oriented language. It is like many of the best languages for larger computers, such as Pascal. If nothing else, working with ACTION! will improve your programming style. But there is even more. . .

ACTION! was designed for use on microcomputers, so certain important abilities are built in and easily accessed. It is easier to PEEK and POKE. Relocating an ARRAY is so simple that I've redone the Operating System line plotting routine to execute twice as fast. (More about this later.)

The BASIC command POKE 710,0 in line 202 sets the background color to black on the GR.8 screen. The ACTION! equivalent is **c2=0** at the top of **Setup**. This is because of the earlier declaration **BYTE c2=710**. This establishes c2 as a **BYTE** variable with values 0—255. More importantly, it's placed at memory location 710 (the register for color 2). Likewise, since we have **BYTE key=764**, the conditional **key<255** in ACTION! is the same as the BASIC PEEK(764)<255.

If that's all there were, it wouldn't seem like much. But not the least of ACTION! features is that it is a compiled language. The listing of SPLASH2 is technically just the source code. It could be written on any word processor. To run it, you must first compile it. This takes less than 2 seconds. The compiled version (object code) is full-fledged 6502 machine language; the same lightning-fast code made with assembly language. With that in mind, look at the ACTION! listing. I think it's easier to read than BASIC. And yet, it is still just about as powerful as any assembly language.

IMPROVE OS ROUTINES

If you run SPLASH2 you'd be surprised at the seeming lack of speed. The joystick moves the center point more than twice as fast, but the splash is only marginally (5%) faster. That bothered me, and I realized the answer is simply that the Plot and DrawTo procedures of ACTION! are the same OS routines accessed from BASIC.

If you tried to improve this speed in BASIC, you'd be sunk. You'd have to write extensive USR routines in assembly language. In ACTION! things are different. You can easily write specialized routines to replace what's in the OS and gain speed.

SPLASH3 FOR SPEED

SPLASH3 (listing 3) is functionally the same as SPLASH2. However, the "splash" moves about twice as fast because I use my own routines **Dot** and **BLine**. The top portion of the program has the file I call **GR8** containing these procedures. The extra speed comes from the fact that these work in GR.8 only, and do not do any error checking. That is done elsewhere in the program.

The procedure **BLine** is an implementation of Bresenham's Algorithm—one of the fastest known. But the real workhorse is the short procedure **Dot**. It takes advantage of the way that ACTION! treats arrays. The declaration **BYTE ARRAY row** creates the CARDinal pointer **row** to the values of the array. Then the assignment **row=adrow(y)** makes this point to the beginning of the 40 bytes of the y-th row of the screen (see **PROC Gr8( )**). It is then fairly easy to move to the correct byte at **row(xb)** and alter it appropriately using mask arrays for the correct position **xr**.

A SPLASH OF COLOR

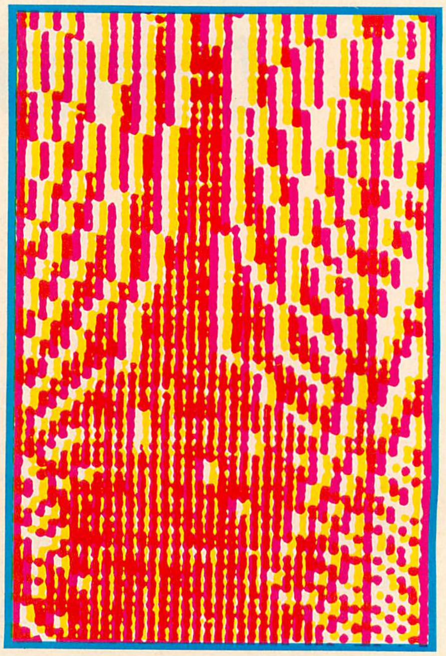
These **Dot** and **BLine** routines are fairly easily adapted to other situations. The last program SPLASH4 (listing 4) works in the 4 colors of a GR.7+ screen. My file GR7PLUS at the top has the changes needed for these procedures. Even more speed is gained since some CARDinal variables can now be replaced by faster BYTE types. The PROCedure **Gr7plus** simply alters the GR.8 display list so that the graphics area becomes GR.7+.

The program SPLASH4 will let you put splashes on the screen in any of the four available colors. I've also made it easy to alter these. Simply press [H][L] to alter the Hue and Luminence of the current color.

In ACTION!, like any other procedure oriented language, it is very easy to use part of one program in another. There is no worry about line number compatibility. For example, you can use my files **GR8** and **GR7PLUS** in any of your own programs. It is easy and rewarding to build up your own library of useful routines. If you're serious about programming your Atari, then I strongly recommend that you get into ACTION!.

(Next month's **Antic** will include a fast-moving ACTION! bonus game.— ANTIC ED)

ACTION!
Optimized Systems Software, Inc.
1221B Kentwood Ave.
San Jose CA, 95129
(408) 446-3099
16K cartridge
$99



Professor Paul Chabot teaches in the Mathematics and Computer Science Department at California State University, Los Angeles.

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SPEECH EDITOR

Menu-driven S.A.M. talk!

by MARK GIAMBRUNO

Speech Editor brings menu-driven convenience to operating one of the Atari's most unusual software products—S.A.M., the Software Automatic Mouth. You'll need 32K RAM on any Atari, a disk drive, BASIC and S.A.M. ($59.95 from Tronix. 8295 La Cienega Blvd. Inglewood, CA 90301. (213) 215-0529.)

Speech Editor gives you quick access to all of S.A.M.'s impressive speech synthesizing features. This program also lets you save phrases as long as 113 characters to disk for later use or modification. But there is a bit of preparation required before you can get started.

Type in the listing for Speech Editor, check it with TYPO II and SAVE it to disk. With your Atari turned off, put the S.A.M. disk in the drive and turn on the machine with BASIC.

After the READY prompt appears, remove the disk and insert your S.A.M. DOS disk (prepared according to instructions in the S.A.M. manual). Type DOS; when the DOS menu comes up, use the [L] command to load RECITER. If you have it, also load KNOBS.REC.

Now use the [B] command to return to BASIC; after you see the ready prompt, insert your disk with the Speech Editor program, and RUN the program. (Disk subscribers please note: you must type ENTER "D: SPEECHED.LST" before typing RUN. We stored the disk version this way to prevent those without S.A.M. from accidentally running the program and crashing their systems.)

Incidentally, the Speech Editor can also be used with S.A.M. by itself, or with S.A.M. and KNOBS.SAM, KNOBS.REC, or RECITER. If both KNOBS are loaded, or if RECITER is loaded with KNOBS.SAM, the knobs option will not be available.

EDITING SPEECH

In the center of the editor's screen is a box of options, variables and their default values. The INPUT is set for S.A.M.—you can only enter phonetic phrases. The other option is REC, for RECITER, which lets you enter English phrases.

When you start, the LIGHTS are off, so the screen will blank during speech. If the LIGHTS are on, text remains on the screen and S.A.M.'s voice is slightly garbled.

SPEED and PITCH are both normally set to 128, S.A.M.'s normal values. The KNOBS are on, activating the THROAT and MOUTH variables. These are also set to normal.

Below the menu box is a list of the program control keys and their functions.

To use the editor, hold the [SELECT] key until the item you wish to edit is chosen. Then use the [OPTION] key to change that item. Thus, if you select INPUT, you can flip between S.A.M. and REC with the [OPTION] key. Numeric values are increased with the [OPTION] key, while the down-arrow key, followed by [OPTION], decreases a value. Note that the numbers change slowly, then gain speed.

Push [START] and you should see the "?" prompt in the lower left-hand corner. You can enter up to three lines (113 characters) of text. Longer phrases may be lost.

The cursor, [INSERT] and [DELETE] keys are all available for editing. When you are finished with a phrase, press [RETURN] and S.A.M. will pronounce your phrase.

The Speech Editor keeps S.A.M. and REC phrases separate, so the last text entered remains in memory and is displayed the next time you press [START]. Entering an improper phrase in the S.A.M. mode causes the keyboard speaker to sound twice; once you have pressed [START] no changes can be made to S.A.M.'s options and variables until you hit [RETURN].

SAVING SPEECH

After you have adjusted the speed, pitch and knob setting, and want to save a phrase, push the [ESC] key to bring up a "Directory, Load or Save

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PICTURE SHOW

"Price's Picture Painter" gets friendlier!

by PATRICK DELL'ERA

*Two modifications of "Price's Picture Painter", the popular graphics utility from the September 1984 issue of **Antic**. The original program allowed users to change all four colors on every scan line of Micropainter style pictures. These two new programs make the original a little friendlier and allow you to load and display your pictures from BASIC. These BASIC programs will run on any Atari computer with a disk drive. But you need the original "Price's Painter" to use them. (Send $5 to **Antic** for the back issue of your choice.)*

*In our September 1984 issue, **Antic** published a pair of very successful machine language graphics programs, "Price's Color Picture Painter" and "Fader". In both cases, these programs were sent to us as binary files with no source code and we rushed them into print because they were such effective graphics tools.*

*At a recent meeting of ABACUS, the San Francisco Atari users' group, we met Patrick Dell'Era who had just finished disassembling and modifying "Fader" very effectively. His easier-handling picture fadeout program will appear in the next **Antic**. This month we present the modifications of "Price's Painter" which Dell'Era swiftly produced to our specifications.* —ANTIC ED

PRICELESS PICTURES

Patrick's Priceless Picture Show (PPPS) is a BASIC program that will display pictures designed by "Price's Color Picture Painter." Type in listing 1 and check it with TYPO II before you SAVE a copy to a disk with some "Price's Painter" files. When PPPS is RUN, it creates a Graphics 7+ screen. It also creates a Graphics 0 screen. They both reside in memory simultaneously and page flipping is utilized as appropriate.

PROGRAM OPERATION

The first things you see are a title and the disk directory of drive 1. The user is then prompted to type in the picture file to be displayed. If the file you want does not appear on the current disk, another disk can be put in the drive. Pressing [RETURN] will show the directory of the new disk.

When the desired file is found, type in its name. The device specifier "D1:" should not be typed. Drive 1 is assumed. PPPS will load the files indicated if no errors are encountered. Otherwise, the disk directory is redisplayed and the process begins again.

Once PPPS finds and loads the picture file, it will then search for its related paint pot files (filename.P0, filename.P1, etc.). Note, if there are no paint pot files, PPPS will just use the default colors. No damage done.

The Graphics 7+ screen is then turned on. The display list interrupts are enabled. And. . .Voila! A pretty picture just like you created on Phillip Price's color manipulation system.

When another picture is desired, press [START] to get back to the input screen. The directory will be displayed. And you will be prompted to type in another file. At this point, the existing picture may be called again by pressing [OPTION]. Return to the PPPS input page by pressing [START].

TECHNICAL NOTES

The essential program components needed to display these pictures are:

Routine to create 7+ display list
Display List Interrupt service routine
Binary get routine
Paint Pot buffers

The Graphics 7+ display list routine is straightforward and entirely in BASIC. The display list interrupt service routine in PPPS is placed in page 6. It is relocatable and could be tucked away anywhere safe, including a string. The binary get routine is held in BGET$. It too could be put anywhere safe because it is relocatable. The paint pot buffers are probably best used in strings as done here, although other methods could be used to create safe buffers. Each paint

PICTURE SHOW
continued

pot buffer must be 192 contiguous bytes long.

The BGET$ routine was, frankly, inspired by the BGET function in BASIC XL (O.S.S., Sunnyvale, CA). It is used in exactly the same fashion. First, a channel must be opened for reading. Then a USR call is made to the address of the BGET routine. The following parameters must be passed in the given order:

Channel number times 16 (1*16, 2*16, etc.)
Address of the buffer
Length of the buffer

If an improper number of variables are passed, nothing will be done and a 255 will be returned to the variable. Any other error number will be returned. If the number is greater than 3, you have a problem.

The display list interrupt service routine needs to know the addresses of the paint pots. Put the address of pot 0 at the start of the routine plus 31; pot 1 at plus 10; pot 2 at plus 19; pot 3 at plus 25. Of course these addresses are stored in lo byte/hi byte fashion.

Having created a 7+ screen, a DLI routine, paint pots, and having loaded a picture, the only thing left to do is turn on the show. This is done by making sure locations 560 and 561 point to the 7+ display list. Then POKE 512 and 513 with the LO/HI address of the DLI service routine. Then POKE 54286 with 192 to allow DLI's. If all is done correctly, you get the picture.

PAINTER PATCH

As mentioned previously, the original "Price's Painter" was rushed into publication and not particularly user friendly. When entering a file name, you could not edit and if you gave it the wrong file name, a screen of garbage appeared. After you finished with your picture, you had to reboot the program to load another picture.

PATCH.BAS will rearrange a few bytes of your original "Price's Painter" binary file. Type in listing 2, checking it very carefully with TYPO II, and then SAVE at least one copy on a disk that also contains the binary file of "Price's Painter", called PAINTER.EXE.

When PATCH.BAS is RUN it tries to open a channel to "D1:PAINTER.EXE". It then reads the file into a buffer where the patching takes place. The buffer is then written to the disk as "PATCHED.EXE", which is your new "PAINTER.EXE". You may change the name later if you wish.

When PATCHED.EXE is loaded, the user is presented with a slightly modified input screen. Other than putting my own name up in lights, the major difference is that the '.PIC' extender is missing from the prompt. This is because a picture need not have that specific extender. In fact, no extender at all is now okay. This will make it unnecessary to rename an uncompacted Micro Illustrator PICTURE file in order to use "Price's Painter."

This patch is more than skin deep, however. For instance, now you can type in letters and delete backspaces and cursor control keys until the cows come home. When you have the filename just the way you want it, press [RETURN]. If somehow you still got it wrong, not to worry. You will simply be brought back for another try.

When you finally do get it right, the picture will be loaded. The paint pots with the same filename (remember, the extender is meaningless), will be loaded. You are then ready to do what you want to your picture.

After your picture is just right, pressing [START] will save the paint pots as they are. CAUTION: The previous pots will be replaced. If you want both, use another disk. You can rename everything later. When you have completed saving the paint pots, lo and behold, you wind up back at the input screen, ready to load another picture or reload the picture just saved. O happy day!

Patrick Dell'Era is a field technician for Pacific Gas & Electric and lives in Northern California's Marin County.

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SPEECH EDITOR
continued from page 45

phrase?" prompt. Push S to see a prompt for a filename. The phrase will be saved with all the present voice control values.

To load a phrase press [ESC] folowed by [L], followed by a filename. At this point, you'll have the option of replacing the saved values—helpful in building a library of voices.

[ESC][D] displays a disk directory. [CONTROL][R] resets the editor to its default condition and clears the phrase memory. [CONTROL][Q] quits the editor, returns you to BASIC, and leaves you with S.A.M., RECITER and KNOBS in memory.

Mark Giambruno of Sacramento, California bought his Atari 800 two years ago on an impulse. Since then, it has been an excellent way to combine his main interests, art, design and electronics.

Listing on page 65.



PARALLEL BUS REVEALED

Conclusion of the first-ever PBI usage guide

by EARL RICE

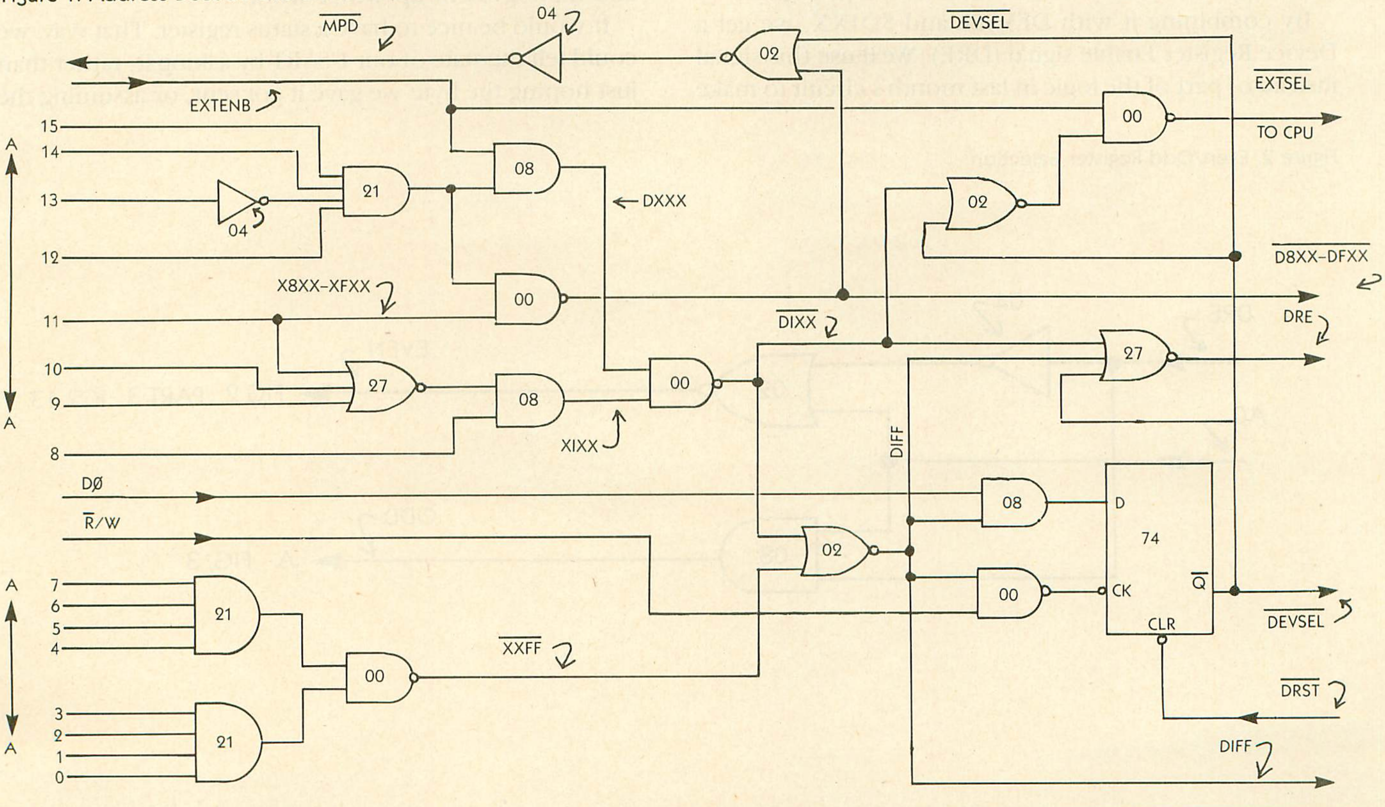
Concluding the four-part series that for the first time teaches advanced XL users how to build an I/O connector for the powerful, ultra-fast Parallel Bus Interface. This article includes an assembly language listing that requires MAC/65 or the Atari Assembler Editor. You will also need access to an EPROM burner. The three earlier installments ran in the January, February and March 1985 issues of Antic.

Last month we looked at a design for a serial I/O device using a readily available USART chip. This month we'll design address decoding logic for the device and see how to add a status register and an interrupt register to it. We'll also look at some example software for the device ROM. But first, a little about last month's design.

This USART design is a simplest case design. Writing to any address in the $D100-$D1FF range puts a character into the transmit buffer and it will be sent out the serial

continued on next page

Figure 1. Address Decode and Device Enable



I/O line. Reading any address in the same range gets the last received character from the receive buffer.

The easiest way to test this arrangement is to tie the serial input and output lines (USART pins 20 and 25) together. If you write a character to the transmit buffer and wait a few milliseconds, you should be able to read the same character from the receive buffer. All this assumes that we're decoding addresses and that we have some software in ROM, so let's get on with those details.

ADDRESS DECODER

Figure 1 is a schematic diagram of an address decoder to provide ROM selection and device register selection.

The output signal $D8XX-$DFXX, combined with the Device Select signal (DEVSEL), provides the Math Pack Disable signal (MPD) to disable the floating point ROM in the CPU so it doesn't contend with our ROM for the data bus. We can use the same signal to select our ROM. This allows us to remove some of the logic from last month's circuit. Just remove the wires from IC4 pins 6, 5, 4, 13, 12 and 11 and connect MPD to ROM pin 20. (See last month's *Figure 2*).

The signal $D1FF selects the Device Enable Latch. When a write signal clocks the 74HCT74 latch, the value of the Data 0 line (D0) will be stored. Writing 1 to address $D1FF selects our external device. Writing 0 deselects it. $D1FF can also be used later to select an interrupt register.

By combining it with DEVSEL and $D1XX, we get a Device Register Enable signal (DRE). We'll use this signal instead of part of the logic in last month's circuit to make the device registers work. Just remove the wires from IC4 pins 3,2 and 1, and connect DRST to IC5 pin 13.

The CPU External Enable signal (EXTENB) lets our device know the computer wants to talk to device registers (or RAM in a more complex application). That signal is combined with DEVSEL and $D1XX to make an External Select signal (EXTSEL) to turn off CPU RAM so as to avoid bus contention.

DEVICE RESET

The Device Reset signal (DRST) comes from last month's circuit and resets the device select latch any time the CPU generates a RESET signal.

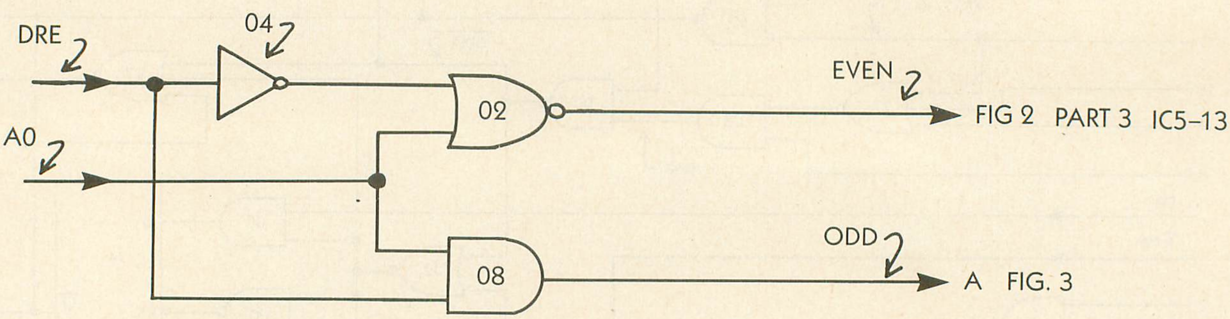
You've probably noticed that this month's schematics are a little different from last month's. Since last month's circuit is the basic recipe for our device, we included IC location assignments and pin numbers.

This month's article deals with several options you might or might not use, so we're giving you IC type numbers and no pin assignments for general logic functions. The number inside or next to a symbol is its type number. For example, 00 means 74HCT00.

Since all the logic is 74HCT series, we just need to use the last digits of the type number to identify a part. Also, be aware that we use both positive and negative names for some signals. R/$\overline{W}$ and $\overline{R}$/W are complementary signals and mixing them up won't work.

It would be nice to have a status register. That way, we could tell the state of our USART by asking it, rather than just hoping the byte we gave it got sent, or assuming the

Figure 2. Even/Odd Register Selection



byte we got from it is a good one. The USART does have a status word available: four bits to read and a reset bit to write to.

The read bits are three error bits: Over-Run (OR), Framing Error (FE) and Parity Error (PE), and a Transmit Buffer Empty bit (TBE). The write bit is a Reset Data Available bit (RDAV). Last month's signal name list explains these bits's functions.

In order to use this new register, we need to expand our addressing capability. *Figure 2* shows a way to use the Address 0 line to select even and odd addresses in the device register space.

STATUS REGISTER

Figure 3 shows an implementation of the status register. The 74HCT244 shown is a tri-state buffer. This allows us to read the status bits when we select any odd address in the device register space. The gate to the USART RDAV pin resets the Data Available flip-flop when we write anything to an odd address.

Latch (*Figure 1*). The remaining bits must be tied to 0 (Ground).

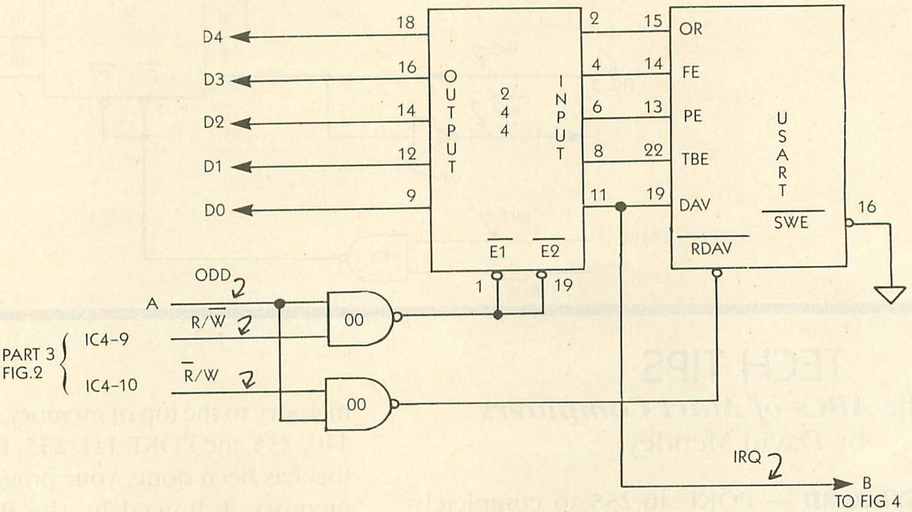
Remember that we've designed this circuit to be the only external device on the parallel bus. If you were to put several devices on the bus, things would get much more complex. Designing a multiple board system is beyond the scope of this article.

But if you're a serious hardware hacker, you can probably extend what we've done here for more than one function. You should also realize that the logic in this design can be streamlined in several places. We aimed for use of only a few IC types, and haven't always optimized for speed or elegance. Sometimes we do things like use a NOR and an inverter to make an OR gate. Bulky, but workable.

YOUR SOFTWARE

Now for software. The only really awkward thing here is that you've got to have access to an EPROM programmer for 2716's. I used a cranky home-built programmer a friend put together. Most large users' groups have at least

Figure 3. Adding A Status Function



The IRQ line is there in case you want to design in an Interrupt Register. We're assuming that we want to generate an interrupt when we get a Data Available signal from the USART.

Figure 4 uses a 74HCT244 to make an interrupt register. This allows the OS interrupt handler to poll our Parallel Bus device to see who made an interrupt request. By putting the IRQ signal on the Data 0 line, we have established our USART device as Device 0.

Putting the signal on the Data 1 line would make it Device 1, Data 3 makes it Device 3, etc. Whatever bit you use here must correspond to the bit you use for the Enable

one member with access to one, so you might try there.

The important part of the ROM is the vector table. You can put all your device driver routines on disk and load them as an AUTORUN.SYS file if you want, but the vector table MUST be in ROM. You can also put your device drivers in ROM if you want.

For our example, we are only implementing INIT, PUT, GET, and STATUS. For simplicity, we're making the drivers contiguous with the ROM vector table to run entirely from ROM.

continued on next page

The drivers in Listing 1 were written using MAC/65 (Optimized Systems Software). The source code will also assemble using the Atari Assembler Editor cartridge.

The drivers are thoroughly commented so it should be easy for you to see how they work. Notice that we reset the CRITIC flag at the beginning of each driver routine. The Generic Handler sets it in advance in case a parallel device is extremely time critical.

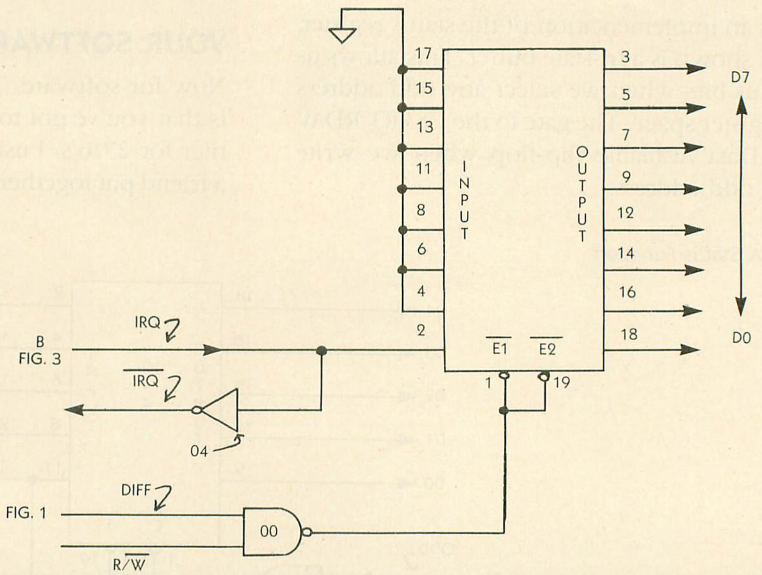
Forgetting to reset CRITIC defeats some OS functions such as software counter timers and key repeat among others. The rest of the code is very straightforward. Many thanks to Dave Menconi, formerly of Atari, for the easy-to-follow listing.

Using these basic ideas with some ingenuity, you should be able to design your own parallel devices for your 800XL or 600XL computer. If you dream up an interesting project, the editors at **Antic** would like to hear about it.

Earl Rice headed users' group support and was an engineering project leader for Atari.

Listing on page 78

Figure 4. Adding An Interrupt Register



TECH TIPS

From the *ABCs of Atari Computers*

by David Mentley

DISABLE KEYBOARD — POKE 16,255 to completely DISABLE the KEYBOARD. This will prevent mischief by those you wish to keep away from your programs.

SAVE "S:" — You can use the SAVE"S:" command to examine the tokenized BASIC programam which you have in memory. Simply LOAD in a BASIC program, and while in the immediate mode, type SAVE"S:" <Return>. The screen will clear and the tokenized program will be listed on the screen.

One further extension of the SAVE"S:" command is to examine the contents of your Atari's memory by using the screen. You must change the value of the registers which store the end of the BASIC file. You can then list out all memory to the top of memory ($FFFF). To do this, POKE 140, 255 and POKE 141, 255, then type SAVE"S:". When this has been done, your program will list, then all free memory, followed by the BASIC cartridge and the Operating System.

DOS VECTOR — When you type DOS in BASIC, a pointer is followed to a routine which loads in the DUP.SYS package of utilities. You can borrow this vector for your own use. The location of the DOS vector is in RAM at locations 10 and 11 ($0A and $0B). Since they are in RAM in page 0, you can change them to point anywhere you want. You could point it at the start of BASIC (40960) or at a subroutine you loaded into memory. Remember, all you have to do to enter the routine once you have changed the vector is type DOS. After you set 10 and 11 they will be reset

continued on next page

when you press SYSTEM RESET unless you do the following. Locations 5446 and 5450 ($1546 and $154A) contain the value that the warmstart routine places back into 10 and 11. So if you POKE your DOS VECTOR location into 5446 and 5450 (LO-HI), you will keep your new pointer until you turn off the power.

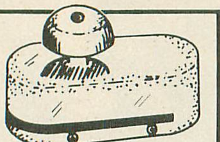
LEFT-HANDED JOYSTICK — You can convert an ordinary Atari joystick to a lefty model by merely unscrewing the base and transposing a few connectors. The button will be on the top right side when you are finished and all of the direction labels on the front should be changed for consistency. The top will become the right side. When you take the bottom off the case, you will see a column of colored connectors. Use the chart below to transpose the wires and put your lefty model back together.

Right	Left
brown	blue
white	brown
black	black
blue	green
green	white
orange	orange

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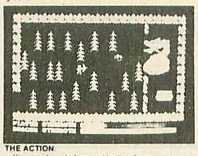
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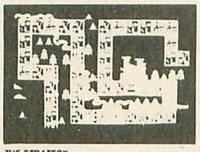
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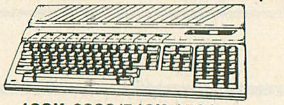
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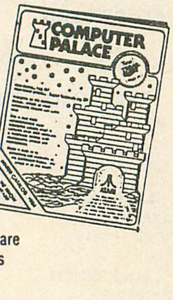
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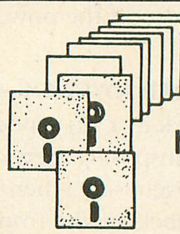
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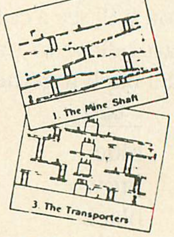
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MANEUVER

100% pure strategy game!

by WILL WOODARD

Maneuver is a strategy game for two players. It is written in BASIC and will run on all Atari computers of any configuration.

Chess was the first and best-known strategy game to be programmed into a computer. But today computerized war games rival chess for popularity, as evidenced by the continuing success of games from Strategic Simulations Inc. and Avalon Hill.

In the basic war game format, solo or multiple players design strategies by giving orders to units of varying strengths before releasing them into a computer-controlled battlefield. A classic Atari example would be "Eastern Front" by Chris Crawford.

Maneuver distills the essence of these war strategy games into an elegant two-player battle of symbols. No huge scrolling map, no tanks and no trees. Just pure strategy!

Type in the program, check it with TYPO II and SAVE a copy before you RUN it. After the title, an 8×8 playing grid will appear with 3 green symbols on the left and 3 red symbols on the right. The green circle will blink and you will be prompted for the first move.

GAME PLAY

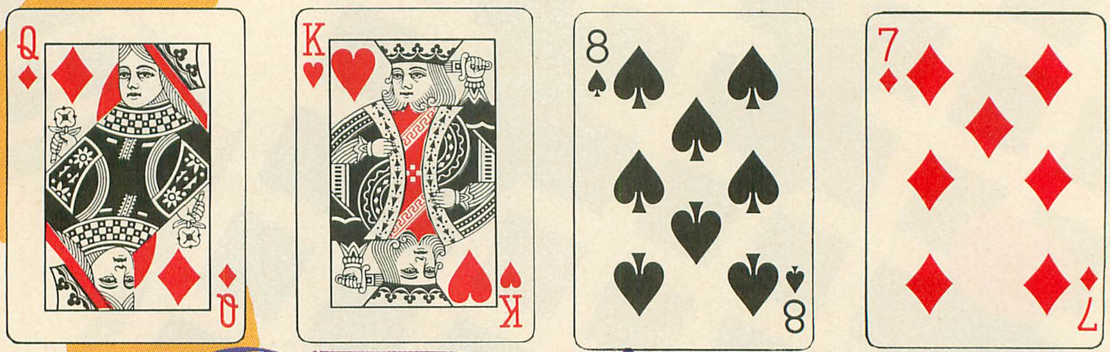
The object of the game is to destroy your opponent's spade before he destroys yours. Each piece must be given five of the possible orders each turn. Orders are entered by pressing the following keys:

KEY	COMMAND
N	move one point north
S	Move one point south
E	Move one point east
W	Move one point west
1	Fire north
2	Fire east
3	Fire south
4	Fire west
—	Skip a move

When one of your pieces flashes, type in 5 of the above orders to control how you want that piece to move and fire. Type in the orders without spaces and without pressing [RETURN]. For example: EESE3 would move your piece east, east, south, east, and then fire in a southernly direction.

After both players type in 5 orders for each of their 3 pieces, the computer takes over, alternately executing each piece's orders one at a time until all 6 have gone through their 5 orders. They will move and fire in this order: circle, spade, heart. On odd turns the red piece will move first, on even the

continued on page 58



CRAZY EIGHTS!

by PRINCETON CHAN

How your computer plays cards

Take on your Atari in a fast-paced computer version of the well-known card game, Crazy Eights. And read this article to find out how the BASIC program makes "intelligent" card-playing decisions. All Atari computers of any memory size will RUN Crazy Eights.

Type in Listing 1, checking it with TYPO II, and SAVE a copy before you RUN the program.

On the screen display, the numbers after the words DECK and COMPUTER refer to how many cards remain in the deck and in the computer's hand. Begin play by selecting an option from the main menu.

When you type in the card you're playing, you only need to enter the first two letters (no numbers are allowed). For example, you can type KI instead of KING—or EI instead of EIGHT (but don't use [8] here).

CRAZY EIGHTS RULES

In case you don't know how to play Crazy Eights, the object is to be the first player who gets rid of all your cards.

Each player is dealt five cards. To get rid of a card you must put it on the discard pile—and your discard must match the pile's top card in either Rank (ace, seven, king, etc.) or Type (spade, diamond, heart, club).

If you don't have a match to discard, you must keep drawing more cards from the deck. The program will let you hold as many as 18 cards in your hand.

In this version of the game, you can only pass your turn to the other player if you are holding 18 cards in your hand or the deck is all gone.

One major thing—the eights are special cards in this game. You or the computer can put an eight onto the discard pile anytime and name whatever card type (suit) you now wish to be on top.

I give you fair warning! Your Atari is very quick and skillful at playing this game. Here's how the program does it:

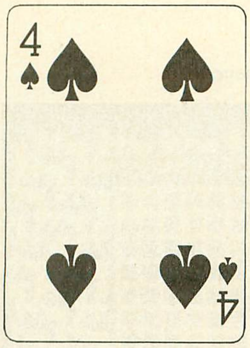
PROGRAM ANALYSIS

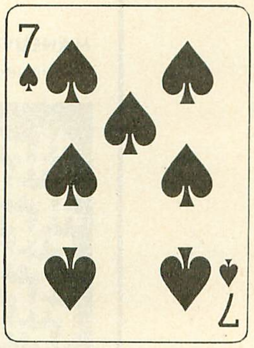
The computer's strategy is contained in lines 730 to 830. First the computer checks to see whether it has a card to put down. If it does, it may try to search for another before using the first card it found. If the computer has an eight, it decides which type of card to use—hearts, diamonds, spades, or clubs.

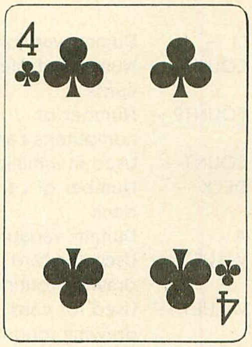
In the event that there are no cards to put down, the computer will draw from the deck until there is, or else pass. This is all the computer's strategy consists of. Now let us look at lines 730 to 830 in detail.

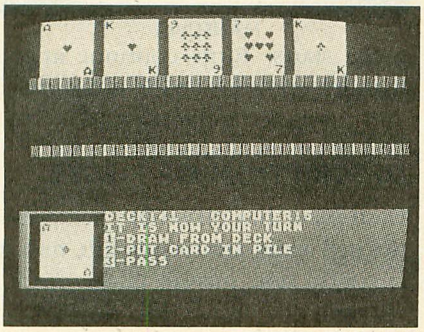
Line 730 does the job of clearing the bottom of the screen, pausing, and displaying the message which tells that it is the computer's turn.

Line 740 uses a loop that checks to see whether the rank: HAND2(L1) and type: TYPE2(L1) of the computer's card matches that of the deck. It also checks to see if the computer has an eight. The variable L1 holds the location of the chosen card in the arrays









HAND2 and TYPE2. When the computer neither has a matching card nor an eight the program jumps to line 800.

The unchecked cards are tested in line 745. The loop begins at L1, the location of the first usable card in the arrays. It ends with 18, the maximum number of cards anyone can have. If there is no matching card, the computer jumps to line 750.

However, if the computer finds another matching card on line 745, it makes a random decision as to whether it should use the first or second card it found. There is a 50/50 chance. If the random number is a 1, the variable L1 is equal to the second choice.

Line 750 jumps the program to line 780 when the computer uses an eight. Lines 760 to 770 change the computer's variables and redraw the top card. The number of cards the computer has is subtracted: COUNT2=COUNT2-1.

Line 780 determines which type of card will be picked when the computer puts down an eight. PILE1=INT(RND(0)*4)+1 determines which type of card. A one would choose a heart, two a diamond, three a club, and four a spade. The rest of the line checks to see if the computer has the type of card picked. It will also skip the card if its rank is an eight because that card will no longer be part of the computer's hand.

In line 790, the array TYPE2(L1) which holds the location of the eight card, is changed according to the type of card the computer picked. Remember that with eights, you can pick any type of card you want.

Line 800 checks to see if there is a tie by checking whether DECK<=0 and the opponent's cards. The loop checks the player's cards by comparing the types and ranks of each card to the top card and checking for eights. If the opponent has no matching cards, it is an automatic tie. Don't forget that the computer got to this line when it had no matching cards back at line 740. At the time of a tie, the computer goes to line 1530 which ends the game.

At line 810, when the computer holds the maximum of 18 cards and does not have a match, or DECK<=0 (no more cards to draw), the computer must pass. A message on the screen tells this.

Lines 820 to 830 are where the computer locates the first empty location in the array HAND2(L) by using a loop: FOR L=1 TO 18:IF HAND2(L)<>0 THEN NEXT L. The part of the array is blank when there is a zero. After the computer finds an empty space, it puts the top card's rank and type into HAND2(L) and TYPE2(L). The computer's number of cards are added (COUNT2=COUNT2+1), and the number of cards in the deck subtracted (DECK=DECK-1)

This whole process cycles again the next time the computer puts down a card. The strategy in this program is actually simple and could have been made more complex. As you can see, your Atari is just using its number-crunching power to match programmed values quickly and accurately.

Princeton Chan is a freshman at Lowell High School in the Richmond district of San Francisco.

Crazy Eights Take-Apart

Line 60	Dimensions arrays
70–80	Initializes display list interrupt
90–110	Initializes P/M Graphics
120–180	Redefines character set
190–200	Title page
210–320	Initializes cards and starts game
330–360	Main menu
370–410	Player draws card
420–710	Player puts down card
720	Player passes
730–830	Computer's turn
850–1410	Card drawing and positioning routines
1420	Clears bottom of screen
1430–1450	Pauses
1460	Waits for RETURN to be pressed
1470–1510	Used to check for input
1530–1590	End of game

continued on next page

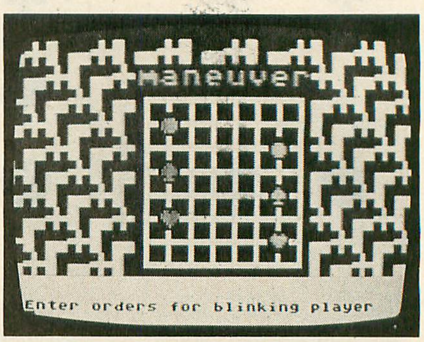
CRAZY EIGHTS
continued

List of Variables

CARD —	Rank of all cards of deck
CARD1 —	Type of all cards of deck
HAND1 —	Rank of player 1's cards
HAND2 —	Rank of computer's cards
TYPE1 —	Type of player 1's cards
TYPE2 —	Type of computer's cards
CHOICE$ —	Holds input from user
CHAR$ —	Holds machine language routine
DL —	Used to find display list
L —	Dummy variable
D —	Dummy variable
PMBASE —	Used to find highest memory for P/M Graphics
CHBASE —	Used to find highest memory for new character set
L1 —	Dummy variable
COUNT1 —	Number of player 1's cards
COUNT2 —	Number of computer's cards
COUNT —	Used in initializing
DECK —	Number of cards in deck
A —	Dummy variable
VALUE —	Used for card drawing routine
VALUE1 —	Used for card drawing routine
TOP —	Rank of top card
TOP1 —	Type of top card
X —	Position of card
Y —	Position of card
CHOICE —	User input
PILE —	Rank of input card
PILE1 —	Type of input card
NMB —	Used in card drawing routine
NMB1 —	Used in card drawing routine
Step —	Used in card drawing routine
COL —	Used in card drawing routine

Listing on page 76

MANEUVER
continued from page 55



MANEUVER

green starts. Turns continue in this manner until one spade is destroyed and a winner is declared.

DESCRIPTION OF PIECES

Each piece has different characteristics in 3 areas: armor strength, missile strength, and missile range. Armor strength determines how much damage a piece can take. Missile strength refers to how much damage a missile will do. Missile range is the distance a missile will travel. When armor strength reaches zero, the piece is destroyed. This is shown in the following table:

	ARMOR STRENGTH	MISSILE RANGE	MISSILE STRENGTH
CIRCLE	13	5	3
SPADE	20	3	5
HEART	17	4	5

The closer you are to a piece the more damage you will do. Damage is calculated as:

missile strength × 1 ÷ distance to target.

There is a random element thrown in to make the outcome less certain.

Now that you know the fighting rules and the strengths of your army, we'll leave the battle strategy to you. Happy maneuvering!

Will Woodard of Dallas is currently working on a master's degree in computer science at North Texas State University, with emphasis on artificial intelligence. On the Atari, he specializes in war and strategy gaming.

Listing on page 74

SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

DISK SUBSCRIBERS: You can use all these programs immediately. Just follow the instructions in the accompanying magazine articles.

Antic program listings are typeset by Star's Gemini 10X Printer—From Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Shown below are the Atari Special Characters as printed in **Antic** listings—and the keys you must type in order to get them. Boxes are drawn around the normal video characters here so you can see their positions more accurately, these boxes do not appear in the printed listings.

Whenever the CTRL key (CONTROL on XL models) or SHIFT key is used, *hold it down* while you press the next keys. Whenever the ESC key is used, *press and release* it before typing the next keys.

Turn on inverse video by pressing the Atari logo key Λ once. Turn it off by pressing a second time. (XL models use the Reverse Video Mode Key instead.)

Sometimes it's not easy to tell apart the following characters, shown here in both normal and inverse video. Be especially careful when you type any of these:

	CTRL F		/
	CTRL G		SHIFT +
	CTRL N		SHIFT -
	CTRL R		-
	CTRL S		+

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL T
	CTRL A		CTRL U
	CTRL B		CTRL V
	CTRL C		CTRL W
	CTRL D		CTRL X
	CTRL E		CTRL Y
	CTRL F		CTRL Z
	CTRL G		ESC ESC
	CTRL H		ESC CTRL -
	CTRL I		ESC CTRL =
	CTRL J		ESC CTRL +
	CTRL K		ESC CTRL *
	CTRL L		CTRL .
	CTRL M		CTRL ;
	CTRL N		SHIFT =
	CTRL O		ESC SHIFT CLEAR
	CTRL P		ESC DELETE
	CTRL Q		ESC TAB
	CTRL R		
	CTRL S		

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	ΛCTRL ,		ΛCTRL Y
	ΛCTRL A		ΛCTRL Z
	ΛCTRL B		ESC SHIFT DELETE
	ΛCTRL C		ESC SHIFT INSERT
	ΛCTRL D		ESC CTRL TAB
	ΛCTRL E		ESC SHIFT TAB
	ΛCTRL F		ΛCTRL .
	ΛCTRL G		ΛCTRL ;
	ΛCTRL H		ΛSHIFT =
	ΛCTRL I		ESC CTRL 2
	ΛCTRL J		ESC CTRL DELETE
	ΛCTRL K		ESC CTRL INSERT
	ΛCTRL L		
	ΛCTRL M		
	ΛCTRL N		
	ΛCTRL O		
	ΛCTRL P		
	ΛCTRL Q		
	ΛCTRL R		
	ΛCTRL S		
	ΛCTRL T		
	ΛCTRL U		
	ΛCTRL V		
	ΛCTRL W		
	ΛCTRL X		

HOW TO USE TYPO II

Type in TYPO II and SAVE a copy to disk or cassette.

Type GOTO 32000 and follow TYPO II onscreen instructions. If the resulting two-letter line codes are not exactly the same as those in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

BASIC XL cartridge owners type SET 5,0 and SET 12,0 before using TYPO II.

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? " TYPO II "
EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

ERROR FILE

INCOME TAX SPREADSHEET

February '85

To squeeze characters into cells E68-E75, eliminate all spaces and leave out 'THEN' and 'ELSE'. These words may be added after the formula has been accepted.

KOOKY'S QUEST

February '85

The following line is missing:

2100 FOR S=32 TO 16 STEP -4: SOUND 0,S,14,10: EA=EA*EA*EA: SOUND 0,0,0,0: EA=1 ^0:NEXT S

DRUM SYNTH

February '85

In Figure 1, the "ART" should be the Fuji (inverse) symbol.

MISSING INFOBITS

DECEMBER '84

The AL source listing for Infobits (Dec. '84) was left out of the previous issue. You'll find it in the Jan. '85 Software Library.

ADVENT X-5

November '84

Missing line: 8020 RUN. Also, cassette owners should change the 138 in line 4005 to 130. The TYPO II code for line 1005 is EJ.

ADVENTURE ISLAND

November '84

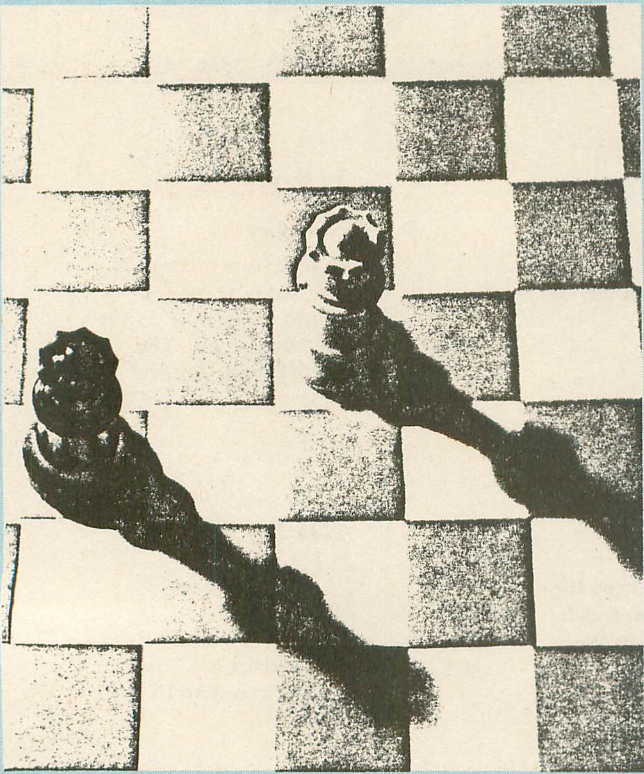
Line 837 is missing its last item of data, a 4. Also, it will not run with DOS XL.

THE EIGHT QUEENS PROBLEM

Article on page 33.

LISTING 1

```
JU 5 REM THE EIGHT QUEENS PROBLEM
OK 6 REM BY ANGELO GIAMBRA
OO 7 REM ANTIC MAGAZINE
MJ 10 GOTO 210
SP 20 IF COL(ROW)>8 THEN 160
RP 30 FOR I=1 TO 8:IF A(I,COL(ROW))=1 THEN STARTOVER=1:I=8
IS 40 NEXT I
JB 50 IF STARTOVER THEN STARTOVER=0:COL(ROW)=COL(ROW)+1:GOTO 20
UQ 60 FOR CT=1 TO 4
AP 70 INC=(CT=1 OR CT=2)*-1+(CT=3 OR CT=4):INC1=(CT=1 OR CT=4)*-1+(CT=2 OR CT=3)
HJ 80 X=ROW+INC:Y=COL(ROW)+INC1:IF X<1 OR X>8 OR Y<1 OR Y>8 THEN 120
AE 90 IF A(X,Y)=1 THEN STARTOVER=1:GOTO 50
MP 100 X=X+INC:Y=Y+INC1:IF X<1 OR X>8 OR Y<1 OR Y>8 THEN 120
SG 110 GOTO 90
NB 120 NEXT CT
JZ 130 A(ROW,COL(ROW))=1:COLOR 1:SOUND 0,50,10,10
CY 140 T=COL(ROW)+5:Q=ROW:POSITION T,Q:? #6;"!":SOUND 0,0,0,0:ROW=ROW+1:IF ROW=9 THEN 280
EV 150 COL(ROW)=1:GOTO 30
SL 160 ROW=ROW-1:A(ROW,COL(ROW))=0:SOUND 0,100,10,8
IR 170 COLOR 0:T=COL(ROW)+5:Q=ROW:POSITION T,Q:? #6;" ":SOUND 0,0,0,0
DV 180 COL(ROW)=COL(ROW)+1:IF COL(ROW)=9 AND ROW=1 THEN 320
AL 190 IF COL(ROW)=9 THEN 160
PX 200 GOTO 30
MN 210 DIM A(8,8),COL(8),C(8,8)
IG 220 ? "↖↓↓↓↓▸STARTING POSITION (1-8)";:INPUT C
CA 230 OPEN #1,4,0,"K":X=1:COLOR 1
QN 240 FOR I=1 TO 8:FOR Z=1 TO 8:A(I,Z)=0:NEXT Z:NEXT I
DW 250 FOR I=1 TO 8:COL(I)=I:NEXT I:COL(1)=C
TR 260 GOSUB 340
UR 270 ROW=1:S=0:GOTO 130
YP 280 S=S+1:? "                SOLUTION ";S:? "              PRESS ANY KEY↑"
AA 290 FOR I=1 TO 10:SETCOLOR 4,15,4:FOR Z=1 TO 10:SOUND 0,Z*2,10,10:SOUND 1,Z*10,10,10:NEXT Z
TJ 300 SETCOLOR 4,0,0:FOR Z=1 TO 10:NEXT Z:NEXT I:SOUND 0,0,0,0:SOUND 1,0,0,0
UZ 310 GET #1,CH:? "    ↑↑":GOTO 160
HK 320 ? "↓                 DONE      "
NP 330 GOTO 330
JE 340 DIM X$(1),PL$(2048):PL$(1)=CHR$(0):PL$(2048)=CHR$(0):PL$(2)=PL$:A=ADR(PL$):PMBASE=INT(A/1024)*1024
VW 350 IF PMBASE<A THEN PMBASE=PMBASE+1024
JE 360 S=PMBASE-A+1:POKE 106,144:POKE 106,PEEK(106)-4
VT 370 POKE 106,PEEK(106)-16:GRAPHICS 2:POKE 704,34:POKE 705,34:POKE 710,0:POKE 709,0:POKE 710,40:POKE 559,0
GU 380 POKE 752,1:? "      EIGHT QUEENS PROBLEM":POKE 756,PEEK(106):Z=PEEK(106)*256
RE 390 DATA 85,85,127,28,28,127
YN 400 FOR I=57344 TO 57344+512:POKE Z,PEEK(I):Z=Z+1:NEXT I:Z=PEEK(106)*256+9
CV 410 FOR I=1 TO 6:READ A:POKE Z,A:Z=Z+1:NEXT I
GY 420 POKE 706,34:POKE 707,34:POKE 53248,96:POKE 53249,112:POKE 53250,128:POKE 53251,144
SS 430 FOR I=408 TO 471:PL$(S+I,S+I)=CHR$(255):NEXT I
CG 440 X1=63:X$=CHR$(240):X=535:GOSUB 500:X=663:GOSUB 500:X=791:GOSUB 500:X=919:GOSUB 500
EO 450 X1=55:X$=CHR$(15):X=543:GOSUB 500:X=671:GOSUB 500:X=799:GOSUB 500:X=927:GOSUB 500
GY 460 POKE 53277,3:POKE 54279,PMBASE/256
JK 470 FOR I=0 TO 3:POKE 53256+I,1:NEXT I:POKE 559,46
QN 480 POKE 53252,95:POKE 53253,161:POKE 711,34:POKE 623,20
ZS 490 RETURN
ON 500 FOR I=X TO X+X1 STEP 16:FOR D=1 TO 8:PL$(S+I+D,S+I+D)=X$:NEXT D:NEXT I:IF X1=63 THEN PL$(S+X)=CHR$(255)
WR 510 PL$(S+X+X1+1,S+X+X1+1)=CHR$(255):RETURN
```



automatic secret code program!

SECRET AGENT

Article on page 37.

LISTING 1

```
HU 100 REM SECRET AGENT
KW 110 REM BY JOHN T. SMITH
UC 120 REM ANTIC MAGAZINE
CW 1000 GOSUB 25000
ZC 2000 DIM A$(1),AKEY$(25),DASH$(25),M$(
   2000),T$(2000),MSCR$(500)
IR 2050 DIM INFILE$(15),OUTFILE$(15),BL$(
   40),L$(12)
DL 2100 BL$(1)=" ":BL$(40)=BL$:BL$(2)=BL$
WZ 2150 LO=31:HI=90
CT 4000 REM ***MAIN MENU***
ZZ 4050 ? CHR$(125):POKE 710,160:POKE 712
   ,48
FX 4120 ? :? :? "              SECRET AGENT
   ":? :?
II 4140 ? "           MAIN MENU    ":? :?
   :?
QP 4170 ? "MAKE YOUR SELECTION":?
WQ 4200 ? "    1--TO SELECT A NEW KEYWORD"
HR 4210 ? "    2--TO ENCODE A MESSAGE"
AZ 4220 ? "    3--TO DECODE A MESSAGE"
YN 4230 ? "    4--TO DISPLAY CURRENT KEYWO
   RD"
RW 4240 ? "    5--TO END PROGRAM":?
TQ 4300 ? "   ";
YJ 4310 TRAP 4300:INPUT CHOICE:TRAP 40000
LN 4320 CHOICE=INT(CHOICE):IF CHOICE<1 OR
    CHOICE>5 THEN 4300
UZ 4360 IF CHOICE=5 THEN END
VR 4370 IF CHOICE=4 THEN GOSUB 12000:GOTO
    4050
JM 4390 IF CHOICE=2 OR CHOICE=3 THEN GOSU
   B 6000:GOTO 4050
PC 4400 IF CHOICE=1 THEN GOSUB 5000:GOTO
   4050
BQ 5000 REM ***KEYWORD SECTION***
II 5110 ? CHR$(125):POKE 710,210:POKE 712
   ,130
DA 5115 DASH$(1)="-":DASH$(25)=DASH$:DASH
   $(2)=DASH$
EL 5120 AKEY$=BL$:A$(1,1)=BL$
KS 5130 ? :? :? "                KEYWORD "
   :? :? :?
JF 5140 ? "LENGTH OF KEYWORD (1 TO 25)";
FK 5145 TRAP 5140:INPUT KEYLIM:TRAP 40000
YJ 5150 KEYLIM=INT(KEYLIM):IF KEYLIM<1 OR
    KEYLIM>25 THEN 5140
TU 5160 DASH$=DASH$(1,KEYLIM)
EX 5190 ? :? :? "ENTER YOUR ";KEYLIM;" CH
   ARACTER KEYWORD"
TK 5200 ? "ONE CHARACTER AT A TIME":? :?
   :?
XC 5250 FOR J=1 TO KEYLIM
PT 5260 ? "CHARACTER ";J;" :  ";
DY 5270 TRAP 5270:INPUT A$:TRAP 40000
NP 5280 M=ASC(A$)
EL 5290 IF M>HI OR M<=LO THEN POP :GOTO 5
   400
DR 5300 AKEY$(J,J)=A$
FN 5310 NEXT J
EH 5330 ? :? :? :? :? "YOUR KEYWORD IS: "
   :?
TJ 5335 ? "       ";AKEY$
LH 5340 ? "       ";DASH$
GP 5350 FOR N=1 TO 250:NEXT N:RETURN
PF 5400 ? :? :? "      INVALID CHARACTE
   R ":?
PD 5430 ? "KEYWORD CHARACTER ";A$
MB 5440 ? "IS NOT IN THE AUTHORIZED LIST.
   "
VJ 5450 ? "PLEASE CHOOSE A NEW KEYWORD."
VJ 5460 FOR N=1 TO 300:NEXT N:GOTO 5110
RN 6000 REM ***ENCODING/DECODING SECTION*
   **
GG 6020 ? CHR$(125)
JP 6050 M$(1)="":M$(2000)=M$:M$(2)=M$:T$=
   M$
TF 6075 L=LEN(AKEY$):IF L<>0 THEN 6190
RU 6090 POKE 710,48:POKE 712,130:POSITION
    10,6:PRINT "     NO KEYWORD FOUND "
AW 6100 POSITION 10,10:PRINT " PLEASE CHO
   OSE KEYWORD FIRST "
GA 6110 FOR N=1 TO 250:NEXT N:RETURN
KC 6190 ? CHR$(125):POKE 710,0:POKE 712,4
MW 6220 ? :? :? :? "           INPUT/OUT
   PUT CONTROL ":? :? :?
QG 6240 ? "SELECT INPUT DEVICE":?
BR 6250 ? "   1--KEYBOARD"
ME 6255 ? "   2--DISK"
SF 6260 ? "   3--CASSETTE":?
UL 6270 ? "   ";
XC 6275 TRAP 6270:INPUT IN:TRAP 40000
FE 6280 IF IN<>1 AND IN<>2 AND IN<>3 THEN
    6270
ZX 6300 IF IN=1 OR IN=3 THEN 6510
RI 6330 ? CHR$(125):? :? :? "        DISK
   INPUT FILE ":? :?
GN 6340 INFILE$=BL$:L$=BL$
AG 6360 ? :? :? "INPUT FILE NAME:  ";
OG 6370 TRAP 6370:INPUT L$:TRAP 40000
ZX 6380 IF L$="" THEN 6340
VL 6390 L=LEN(L$)
XV 6410 ? :? "DISK DRIVE NUMBER:  ";
CK 6420 TRAP 6420:INPUT A$:TRAP 40000
AP 6430 IF A$="" OR A$=" " THEN A$="1"
ZC 6440 IF A$<>"1" AND A$<>"2" AND A$<>"3
   " AND A$<>"4" THEN 6410
DW 6450 INFILE$(1,1)="D":INFILE$(2,2)=A$:
   INFILE$(3,3)=":":INFILE$(4,L+3)=L$
AO 6490 OPEN #1,4,0,INFILE$
FM 6510 ? CHR$(125):? :? :?
CK 6520 OUT=1
UL 6530 ? "         INPUT/OUTPUT CONTROL
   ":? :?
JB 6540 ? "OUTPUT WILL APPEAR ON THE SCRE
   EN.":? :?
HF 6545 ? "  SELECT ADDITIONAL OUTPUT DEV
   ICES:":?
WN 6550 ? "     DISK (Y/N): ";
EX 6560 TRAP 6550:INPUT A$:TRAP 40000
JB 6565 IF A$="Y" THEN OUT=OUT*2
IA 6570 IF A$<>"Y" AND A$<>"N" THEN 6550
DO 6575 ? :PRINT "     PRINTER (Y/N): ";
IV 6580 TRAP 6575:INPUT A$:TRAP 40000
KK 6585 IF A$="Y" THEN OUT=OUT*3
SD 6590 IF A$<>"Y" AND A$<>"N" THEN 6575
ZG 6595 ? :? "     CASSETTE (Y/N): ";
IZ 6600 TRAP 6595:INPUT A$:TRAP 40000
KR 6605 IF A$="Y" THEN OUT=OUT*4
UB 6610 IF A$<>"Y" AND A$<>"N" THEN 6595
TU 6620 IF OUT=1 OR OUT=3 OR OUT=4 OR OUT
   =12 THEN 8020
VM 6660 OUTFILE$=BL$:L$=BL$
JM 6680 ? CHR$(125):? :? :? "       DISK
   OUTPUT FILE ":? :?
CJ 6690 ? "OUTPUT FILE NAME:  ";
```

continued on next page

```
MC 6700 TRAP 6700:INPUT L$:TRAP 40000
DN 6710 IF L$="" THEN 6660
UY 6720 L=LEN(L$)
YK 6740 ? :? "DISK DRIVE NUMBER:  ";
FW 6750 TRAP 6750:INPUT A$:TRAP 40000
BE 6760 IF A$="" OR A$=" " THEN A$="1"
NK 6770 IF A$<>"1" AND A$<>"2" AND A$<>"3
   " AND A$<>"4" THEN 6740
EX 6780 OUTFILE$(1,1)="D":OUTFILE$(2,2)=A
   $:OUTFILE$(3,3)=":":OUTFILE$(4,L+3)=L$
LA 6820 OPEN #2,8,0,OUTFILE$
TA 8000 REM ***ENCIPHERING/DECIPHERING***
YU 8020 ? CHR$(125):POKE 710,192:POKE 712
   ,112:? :?
BX 8050 IF CHOICE=2 THEN ? "
   ENCODING MESSAGE "
NH 8060 IF CHOICE=3 THEN ? "
   DECODING MESSAGE "
HM 8080 IF IN=2 THEN 8300
IV 8090 IF IN=3 THEN 8400
DR 8110 ? :? :? :? :? "ENTER YOUR MESSAGE
   ."
JL 8120 ? "PRESS  RETURN TO END YOUR MESS
   AGE."
AM 8130 ? :? "      MESSAGE:  [";
GM 8160 OPEN #3,4,0,"K:"
TA 8180 M$=""
JU 8190 GET #3,M
BZ 8195 IF M=155 THEN 8280
HY 8200 ML=LEN(M$)
WY 8210 IF M=126 THEN 8250
JV 8215 IF M>HI OR M<=LO THEN 8190
JL 8220 M$(ML+1,ML+1)=CHR$(M)
TZ 8230 ? CHR$(M);
VJ 8240 GOTO 8190
EA 8250 IF ML>1 THEN M$=M$(1,ML-1)
OC 8260 IF ML=1 THEN M$=""
VC 8265 ? CHR$(M);
VS 8270 GOTO 8190
QV 8280 ? "]":CLOSE #3:GOTO 8700
KD 8300 REM ***DISK INPUT***
SJ 8310 M$=""
QE 8320 ? :? :? :? "           DISK INPUT "
IK 8330 GET #1,M
BP 8340 IF M=155 THEN 8380
FQ 8345 IF M>HI OR M<=LO THEN 8330
IP 8350 ML=LEN(M$)
JZ 8360 M$(ML+1,ML+1)=CHR$(M)
TS 8370 GOTO 8330
WE 8380 CLOSE #1:GOTO 8700
BX 8400 REM ***CASSETTE INPUT***
NY 8430 ? :? :? :? "       CASSETTE INPUT "
   :? :?
FB 8440 ? "PREPARE CASSETTE PLAYER."
DS 8450 ? :? "PRESS  RETURN  WHEN READY."
BO 8480 OPEN #4,4,0,"C:"
TJ 8490 M$=""
JM 8500 GET #4,M
BI 8510 IF M=155 THEN 8560
DM 8520 IF M>HI OR M<=LO THEN 8500
IN 8530 ML=LEN(M$)
JX 8540 M$(ML+1,ML+1)=CHR$(M)
TB 8550 GOTO 8500
PF 8560 CLOSE #4
TJ 8690 REM ***TRANSLATION SECTION***
II 8700 ML=LEN(M$)
KX 8710 IF ML<>0 THEN 8800
UQ 8730 ? :? :? :? "     NO MESSAGE"
GX 8740 FOR N=1 TO 250:NEXT N:RETURN
QD 8800 ? :? :POKE 752,1
WP 8840 J=1
PV 8850 FOR I=1 TO ML
MF 8860 M=ASC(M$(I,I))
UI 8880 IF M>HI OR M<=LO THEN INDEX=M:GOT
   O 8990
WY 8910 IF CHOICE=2 THEN INDEX=M+ASC(AKEY
   $(J,J))
ME 8930 IF CHOICE=3 THEN INDEX=M-ASC(AKEY
   $(J,J))+(HI-LO)
BS 8950 IF INDEX>HI THEN INDEX=INDEX-(HI-
   LO)
BV 8960 IF INDEX>HI THEN INDEX=INDEX-(HI-
   LO)
EV 8970 IF INDEX<=LO THEN INDEX=INDEX+(HI
   -LO)
KF 8990 T$(I,I)=CHR$(INDEX)
OT 9000 POSITION 15,20
KE 9020 IF CHOICE=2 THEN ? " ENCODING "
AE 9030 IF CHOICE=3 THEN ? " DECODING "
AX 9050 SOUND 0,0,1,12:FOR N=1 TO 2:NEXT
   N:SOUND 0,0,0,0
QQ 9080 POSITION 15,20:? "            "
IX 9090 IF J>=KEYLIM THEN J=0
LB 9100 J=J+1
FF 9120 NEXT I
GW 9140 POKE 752,0:T$=T$(1,ML)
ZM 9170 IF OUT=1 THEN 9700
PK 9180 IF OUT=2 OR OUT=6 THEN 9460
ZX 9190 IF OUT=3 THEN 9600
BA 9200 REM ***CASSETTE OUTPUT***
AL 9220 ? CHR$(125):? :? :? "       CASSET
   TE OUTPUT ":? :?
JV 9230 ? "PREPARE CASSETE PLAYER."
ZT 9240 ? :? "PRESS  RETURN  WHEN READY."
   :? :? :?
KN 9265 POKE 53775,35:POKE 53768,40:POKE
   53764,0:POKE 53766,0:POKE 53773,255
DM 9270 OPEN #4,8,0,"C:"
PT 9280 FOR I=1 TO ML
PJ 9290 M=ASC(T$(I,I))
PT 9300 PUT #4,M
FG 9310 NEXT I
JL 9320 M=155
QC 9330 PUT #4,M
OZ 9350 CLOSE #4
BD 9370 IF OUT=4 THEN 9700
VY 9380 IF OUT=12 THEN 9600
EY 9440 REM ***OUTPUT TO DISK***
WB 9460 ? CHR$(125):? :? :? :? "
   DISK OUTPUT "
QL 9465 FOR I=1 TO ML
PH 9470 M=ASC(T$(I,I))
PX 9480 PUT #2,M
GG 9490 NEXT I
JJ 9500 M=155
PE 9510 PUT #2,M
NU 9520 CLOSE #2
NG 9540 IF OUT=2 OR OUT=8 THEN 9700
FV 9600 REM ***PRINTER OUTPUT***
CT 9610 LPRINT :LPRINT :LPRINT
ZB 9620 IF CHOICE=2 THEN LPRINT "
       ENCODED MESSAGE"
IX 9630 IF CHOICE=3 THEN LPRINT "
       DECODED MESSAGE"
AK 9650 LPRINT :LPRINT :LPRINT :LPRINT "
       MESSAGE:  [";T$;"]"
OH 9700 REM ***SCREEN OUTPUT***
GO 9740 SN=INT(ML/500)+1
VF 9760 FOR I=1 TO SN
GD 9780 MSCR$(1)="":MSCR$(500)=MSCR$:MSCR
   $(2)=MSCR$
EW 9790 ? CHR$(125):? :? :? :?
AC 9820 IF CHOICE=2 THEN ? "
   ENCODED MESSAGE "
AY 9830 IF CHOICE=3 THEN ? "
   DECODED MESSAGE ":? :? :?
MD 9860 SCREND=I*500
WR 9870 IF ML<SCREND THEN SCREND=ML
VT 9880 MSCR$=T$(1+(I-1)*500,SCREND)
BG 9900 ? "      MESSAGE:  [";MSCR$;"]":?
   :? :?
KG 9950 IF SCREND>=ML THEN POP :GOTO 1013
   0
SD 9960 ? "PRESS  RETURN TO CONTINUE"
JO 9970 TRAP 9970:INPUT A$:TRAP 40000
GQ 9990 NEXT I
```

```
AF 10130 ? :? :? "                MESSAGE COMP
   LETED ":? :?
WI 10180 ? "PRESS  RETURN  TO CONTINUE"
CG 10190 TRAP 10190:INPUT A$:TRAP 40000:R
   ETURN
KZ 12000 REM ***CURRENT KEYWORD DISPLAY**
   *
UZ 12010 ? CHR$(125):DASH$(1)="-":DASH$(2
   5)=DASH$:DASH$(2)=DASH$
ZJ 12020 L=LEN(AKEY$):IF L<>0 THEN 12130
UU 12040 POKE 710,48:POKE 712,130
HU 12060 POSITION 14,6:? " NO KEYWORD EXI
   STS "
RN 12080 POSITION 10,10:? " PLEASE CHOOSE
    KEYWORD FIRST "
HZ 12090 FOR N=1 TO 300:NEXT N:RETURN
GR 12130 POKE 710,208:POKE 712,130:DASH$=
   DASH$(1,KEYLIM)
VY 12160 ? :? :? :? "           CURRENT KEY
   WORD ":? :? :?
LH 12190 ? "YOUR CURRENT KEYWORD IS: ":?
EG 12200 ? "        ";AKEY$
WT 12220 ? "        ";DASH$
LN 12270 ? :? :? :? "PRESS  RETURN  TO CON
   TINUE"
YD 12300 TRAP 12300:INPUT A$:TRAP 40000:R
   ETURN
QZ 25000 ? CHR$(125):GRAPHICS 2+16
QA 25100 POSITION 5,4:PRINT #6;"SECRET AG
   ENT"
AO 25110 POSITION 7,7:PRINT #6;"BY"
YL 25120 POSITION 7,8:PRINT #6;"JOHN T. S
   MITH"
GO 25160 FOR N=0 TO 255:SOUND 0,N/2,10,6:
   NEXT N
KZ 25180 FOR N=1 TO 50:SOUND 0,(255-N)/2,
   10,4:NEXT N
VS 25190 FOR N=0 TO 255:SOUND 0,255-N/2,1
   0,4:NEXT N
BB 25200 FOR N=1 TO 64:SOUND 0,N,10,6:NEX
   T N
SZ 25250 SOUND 0,0,0,0:GRAPHICS 0:RETURN
```

menu-driven S.A.M. talk!

SPEECH EDITOR

Article on page 45.

LISTING 1

```
MH 10 REM S.A.M. SPEECH EDITOR
EZ 20 REM BY MARK GIAMBRUNO
RH 30 REM ANTIC MAGAZINE
OL 40 REM WARNING! THIS PROGRAM REQUIRES
        S.A.M. AND WILL LOCK UP YOUR COM-
        PUTER WITHOUT IT.
NJ 50 REM PLEASE READ THE SPEECH EDITOR
        ARTICLE BEFORE USING THIS PROGRAM.
TR 70 GRAPHICS 0:SETCOLOR 1,0,8:SETCOLOR
   2,6,0:POKE 752,1:IF PEEK(8192)<>104 TH
   EN GOTO 1760
VM 80 DIM SAM$(255),NSAM$(255),NREC$(255)
   ,TEMPFN$(12),FN$(14),CHOICE$(1),DIR$(1
   7)
GQ 90 SAM=8192:LIGHTS=8210:SPEED=72:PITCH
   =64:THROAT=128:MOUTH=128:CONSOLE=53279
   :CHOICE=1:COUNT=0:SAMFLAG=1
WY 100 SPEEDREG=8208:PITCHREG=8209:THROAT
   REG=18050:MOUTHREG=18051
VV 110 REM MENU
LL 120 ? CHR$(125):POSITION 11,1:? "  SPE
   ECH EDITOR  "
GG 130 POSITION 12,3:? " ┌──────────────┐ "
QW 140 POSITION 12,4:? " | INPUT:   SAM | "
OL 150 POSITION 12,5:? " | LIGHTS:  OFF | "
ZN 160 POSITION 12,6:? " | SPEED:   72  | "
JH 170 POSITION 12,7:? " | PITCH:   64  | "
BU 180 POSITION 12,8:? " | KNOBS:   ON  | "
UC 190 POSITION 12,9:? " | THROAT:  128 | "
QG 200 POSITION 12,10:? " | MOUTH:   128 | "
RR 210 POSITION 12,11:? " └──────────────┘ "
PC 220 POSITION 6,13:? "USE  SELECT  TO C
   HOOSE ITEM":POSITION 6,14:? "USE  OPTI
   ON /<> TO ALTER ITEM"
SY 230 POSITION 6,15:? "USE  START  TO EN
   TER PHRASE":POSITION 6,16:? "USE  CTRL
   -R  TO RESET EDITOR"
OL 240 POSITION 6,17:? "USE  CTRL-Q  TO Q
   UIT EDITING":POSITION 6,18:? "USE  ESC
     TO LOAD/SAVE PHRASE"
VU 250 POSITION 2,19:? "─────────────────
   ──────────────────"
PF 260 REM CHECK FOR KNOBS
JG 270 IF PEEK(17800)=104 AND PEEK(23789)
   =104 THEN GOTO 310
RL 280 IF PEEK(17800)=104 AND PEEK(18187)
   =32 THEN POKE 18187,0:GOTO 310
BG 290 IF PEEK(17800)=104 THEN KNOBS=1780
   0:KNOBSIN=1:KNOBSFLAG=1:GOTO 330
ID 300 IF PEEK(23789)=104 THEN KNOBS=2378
   9:KNOBSIN=1:KNOBSFLAG=1:THROATREG=2403
   9:MOUTHREG=24040:GOTO 330
UA 310 KNOBSIN=0:KNOBSFLAG=0:POSITION 22,
   8:? "N/A":POSITION 22,9:? "---":POSITI
   ON 22,10:? "---"
KN 320 REM MAIN LOOP
WE 330 POKE 754,255
NE 340 IF PEEK(CONSOLE)=6 THEN GOSUB 440
QN 350 IF PEEK(CONSOLE)=5 THEN GOSUB 560
OW 360 IF PEEK(CONSOLE)=3 THEN GOSUB 650
QD 370 IF PEEK(754)=168 THEN POKE 754,255
   :POKE LIGHTS,0:RUN
US 380 IF PEEK(754)=175 THEN POKE 752,0:P
   OKE 754,255:POKE 764,255:GRAPHICS 0:NE
   W
BY 390 IF PEEK(754)=28 THEN POKE 754,255:
   GOSUB 1160
NV 400 GOTO 340
GA 410 REM DELAY SUBROUTINE
EH 420 FOR DELAY=0 TO 30:NEXT DELAY:RETUR
   N
RV 430 REM START SUBROUTINE
ZY 440 POKE 754,255:POKE 764,255:POKE SPE
   EDREG,SPEED:POKE PITCHREG,PITCH
YB 450 IF KNOBSFLAG<>0 THEN POKE THROATRE
   G,THROAT:POKE MOUTHREG,MOUTH:A=USR(KNO
   BS)
DF 460 IF SAMFLAG=1 THEN SAM$=NSAM$
UG 470 IF SAMFLAG=0 THEN SAM$=NREC$
IZ 480 POKE 703,4:POKE 752,0:ROW=0:IF LEN
   (SAM$)<76 THEN ROW=1
JD 490 POKE 656,ROW:? SAM$:POKE 656,ROW:P
   OKE 657,1:INPUT SAM$:IF LEN(SAM$)>=114
    THEN SAM$(114)=""
IZ 500 POKE 752,1:? CHR$(125):POKE 703,24
```

continued on next page

```
AT 510 A=USR(SAM)
AI 520 IF SAMFLAG=1 THEN NSAM$=SAM$
SS 530 IF SAMFLAG=0 THEN NREC$=SAM$
ZJ 540 RETURN
BA 550 REM SELECT SUBROUTINE
TH 560 GOSUB 420
CD 570 IF CHOICE=1 THEN CHOICE=2:POSITION
   14,4:? "INPUT:":POSITION 14,5:? "LIGH
   TS:":RETURN
CE 580 IF CHOICE=2 THEN CHOICE=3:POSITION
   14,5:? "LIGHTS:":POSITION 14,6:? "SPE
   ED:":RETURN
QI 590 IF CHOICE=3 THEN CHOICE=4:POSITION
   14,6:? "SPEED:":POSITION 14,7:? "PITC
   H:":RETURN
ZG 600 IF CHOICE=4 THEN CHOICE=5:POSITION
   14,7:? "PITCH:":POSITION 14,8:? "KNOB
   S:":RETURN
GP 610 IF CHOICE=5 THEN CHOICE=6:POSITION
   14,8:? "KNOBS:":POSITION 14,9:? "THRO
   AT:":RETURN
QJ 620 IF CHOICE=6 THEN CHOICE=7:POSITION
   14,9:? "THROAT:":POSITION 14,10:? "MO
   UTH:":RETURN
FZ 630 IF CHOICE=7 THEN CHOICE=1:POSITION
   14,10:? "MOUTH:":POSITION 14,4:? "INP
   UT:":RETURN
LV 640 REM OPTION SUBROUTINE
OO 650 IF CHOICE=1 THEN GOTO 730
WP 660 IF CHOICE=2 THEN GOTO 780
ZJ 670 IF CHOICE=3 THEN GOTO 890
PU 680 IF CHOICE=4 THEN GOTO 1030
TD 690 IF CHOICE=5 THEN GOTO 820
TS 700 IF CHOICE=6 THEN GOTO 1060
PW 710 IF CHOICE=7 THEN GOTO 1110
YF 720 REM SAM OR REC OPTION
TD 730 GOSUB 420
PU 740 IF SAMFLAG=0 THEN SAM=8192:SAMFLAG
   =1:POSITION 22,4:? "SAM":RETURN
WZ 750 IF SAMFLAG=1 AND PEEK(18187)<>32 T
   HEN GOTO 1700
SL 760 SAM=8199:SAMFLAG=0:POSITION 22,4:?
   "REC":RETURN
AU 770 REM LIGHTS ON/OFF OPTION
TN 780 GOSUB 420
TH 790 IF SPEEDREG=8208 THEN SPEEDREG=820
   6:PITCHREG=8207:POKE LIGHTS,1:POSITION
   22,5:? "ON ":RETURN
UM 800 SPEEDREG=8208:PITCHREG=8209:POKE L
   IGHTS,0:POSITION 22,5:? "OFF":RETURN
KU 810 REM KNOBS SUBROUTINE
GR 820 IF KNOBSIN=0 THEN GOTO 1710
TE 830 GOSUB 420
TO 840 IF KNOBSFLAG=0 THEN KNOBSFLAG=1:PO
   SITION 22,8:? "ON ":POSITION 22,9:? "
   ":POSITION 22,10:? "   ":GOTO 870
VA 850 KNOBSFLAG=0:POKE THROATREG,128:POK
   E MOUTHREG,128:A=USR(KNOBS):POSITION 2
   2,8:? "OFF"
MW 860 POSITION 22,9:? "---":POSITION 22,
   10:? "---":RETURN
ZX 870 POSITION 22,9:? THROAT:POSITION 22
   ,10:? MOUTH:RETURN
EN 880 REM SPEED SUBROUTINE
JO 890 VALUE=SPEED:X=22:Y=6:GOSUB 920
VQ 900 SPEED=VALUE:RETURN
DS 910 REM PRINT VALUE SUBROUTINE
AR 920 IF PEEK(764)=15 THEN VALUE=VALUE-1
   :GOTO 940
AO 930 VALUE=VALUE+1
GD 940 IF VALUE<0 THEN VALUE=255:GOTO 980
OO 950 IF VALUE>255 THEN VALUE=0
PY 960 IF VALUE<10 THEN POSITION X+1,Y:?
   "  ":GOTO 980
FV 970 IF VALUE<100 THEN POSITION X+2,Y:?
   " "
MH 980 POSITION X,Y:? VALUE
TY 990 IF COUNT<5 THEN COUNT=COUNT+1:FOR
   DLAY=0 TO 30:NEXT DLAY
EW 1000 IF PEEK(CONSOLE)=3 THEN GOTO 920
EC 1010 POKE 764,255:COUNT=0:RETURN
UA 1020 REM PITCH SUBROUTINE
WH 1030 VALUE=PITCH:X=22:Y=7:GOSUB 920
HE 1040 PITCH=VALUE:RETURN
YQ 1050 REM THROAT SUBROUTINE
EB 1060 IF KNOBSIN=0 THEN GOTO 1710
TJ 1070 IF KNOBSFLAG=0 THEN GOTO 1690
YU 1080 VALUE=THROAT:X=22:Y=9:GOSUB 920
EM 1090 THROAT=VALUE:RETURN
EF 1100 REM MOUTH SUBROUTINE
DO 1110 IF KNOBSIN=0 THEN GOTO 1710
SW 1120 IF KNOBSFLAG=0 THEN GOTO 1690
WT 1130 VALUE=MOUTH:X=22:Y=10:GOSUB 920
OJ 1140 MOUTH=VALUE:RETURN
SZ 1150 REM LOAD/SAVE MENU
QX 1160 TRAP 1650
GT 1170 OPEN #1,4,0,"K:":POKE 764,255:POS
   ITION 4,20:? "DIRECTORY, LOAD OR SAVE
   PHRASE?";
JN 1180 POKE 694,0:POKE 702,64:GET #1,KEY
   :IF KEY=68 OR KEY=76 OR KEY=83 THEN ?
   CHR$(KEY):GOTO 1200
NK 1190 ? "⌐";:GOTO 1180
JZ 1200 IF KEY<>68 THEN GOTO 1340
NV 1210 REM SHOW DIRECTORY
SA 1220 CLOSE #1:TRAP 1270:POKE 703,4:POK
   E 754,255:OPEN #1,6,0,"D:*.*"
XN 1230 ? CHR$(125):INPUT #1,DIR$:POKE 65
   6,0:? DIR$;"   ";:INPUT #1,DIR$:? DIR$
JM 1235 INPUT #1,DIR$:? DIR$;"   ";:INPUT
   #1,DIR$:? DIR$
UI 1240 IF DIR$(5)="FREE SECTORS" THEN GO
   TO 1280
YP 1250 GOSUB 1300
WA 1260 POKE 754,255:GOTO 1230
OE 1270 ?
YY 1280 GOSUB 1300
BN 1290 CLOSE #1:? CHR$(125):POKE 703,24:
   POKE 754,255:RETURN
DN 1300 ? "         HIT ANY KEY TO CONTINUE
   "
KR 1310 IF PEEK(754)<>255 OR PEEK(CONSOLE
   )<>7 THEN POKE 754,255:POKE 764,255:RE
   TURN
OX 1320 GOTO 1310
XM 1330 REM ENTER FILENAME
SK 1340 FN$="D:":POKE 752,0:? "  ENTER FI
   LENAME.EXT  ";
PJ 1350 POKE 694,0:POKE 702,64:GET #1,FN
MS 1360 IF (FN>47 AND FN<58) OR (FN>64 AN
   D FN<91) THEN ? CHR$(FN);:FN$(LEN(FN$)
   +1)=CHR$(FN):GOTO 1350
WJ 1370 IF FN=126 THEN FN$(LEN(FN$))="":?
   CHR$(FN);:GOTO 1350
ES 1380 IF FN<>155 THEN ? "⌐";:GOTO 1350
ON 1390 POKE 752,1:?
HF 1400 IF KEY=76 THEN ? "  REPLACE EXIST
   ING VALUES? (Y/N) ":POKE 694,0:POKE 70
   2,64:GET #1,KEY
YZ 1410 CLOSE #1:POSITION 0,20:? "****"
YH 1420 IF KEY=83 THEN GOTO 1590
YH 1430 REM LOAD PHRASE
OA 1440 OPEN #1,4,0,FN$
OJ 1450 TRAP 1550:SAM$=""
TM 1460 IF KEY<>89 THEN GET #1,NSAMFLAG:F
   OR L=1 TO 6:GET #1,Z:NEXT L:IF NSAMFLA
   G<>SAMFLAG THEN GOSUB 740
OT 1470 IF KEY<>89 THEN GOTO 1540
CA 1480 GET #1,NSAMFLAG:GET #1,NLIGHTS:GE
   T #1,SPEED:GET #1,PITCH:GET #1,NKNOBSF
   LAG:GET #1,THROAT:GET #1,MOUTH
HE 1485 IF NSAMFLAG=0 AND PEEK(18187)<>32
    THEN GOTO 1500
OA 1490 IF NSAMFLAG<>SAMFLAG THEN GOSUB 7
   40
KE 1500 IF NLIGHTS<>PEEK(LIGHTS) THEN GOS
```

```
UB 780
QG 1510 SPEED=SPEED-1:GOSUB 890:PITCH=PITCH-1:GOSUB 1030:IF KNOBSIN=0 THEN GOTO 1540
WL 1520 THROAT=THROAT-1:GOSUB 1080:MOUTH=MOUTH-1:GOSUB 1130
HW 1530 IF NKNOBSFLAG<>KNOBSFLAG THEN GOSUB 820
RF 1540 IF NSAMFLAG=0 AND PEEK(18187)<>32 THEN SAM$=NSAM$:GOTO 1570
YB 1545 FOR L=1 TO 113:GET #1,CHAR:SAM$(L,L)=CHR$(CHAR):NEXT L
FY 1550 IF SAMFLAG=1 AND SAM$<>"" THEN NSAM$=SAM$:GOTO 1570
PU 1560 IF SAM$<>"" THEN NREC$=SAM$
WK 1570 CLOSE #1:GOSUB 440:RETURN
FX 1580 REM SAVE PHRASE
QV 1590 OPEN #1,8,0,FN$
QI 1600 PUT #1,SAMFLAG:PUT #1,PEEK(LIGHTS):PUT #1,SPEED:PUT #1,PITCH:PUT #1,KNOBSFLAG:PUT #1,THROAT:PUT #1,MOUTH
ZQ 1610 IF SAM$="" THEN GOTO 1630
AC 1620 FOR L=1 TO LEN(SAM$):CHAR=ASC(SAM$(L,L)):PUT #1,CHAR:NEXT L
AS 1630 CLOSE #1:POKE 754,255:GOTO 1720
HU 1640 REM ERROR HANDLING
FB 1650 CLOSE #1:POKE 754,255:POKE 764,255:ERROR=PEEK(195):POSITION 2,20:? "↑↑↑↑↑":POSITION 11,20
WH 1660 IF ERROR=170 THEN ? " FILE NOT FOUND ":GOTO 1740
PF 1670 IF ERROR=165 THEN ? " NOT A FILENAME ":GOTO 1740
MX 1680 ? "   ERROR # ";:? ERROR:GOTO 1740
PM 1690 POSITION 12,20:? "↖ KNOBS NOT ON ":GOTO 1740
JH 1700 POSITION 8,20:? "↖ RECITER NOT AVAILABLE ":GOTO 1740
UD 1710 POSITION 9,20:? "↖ KNOBS NOT AVAILABLE ":GOTO 1740
EE 1720 POSITION 13,20:? " PHRASE SAVED ":GOTO 1740
IK 1730 POSITION 2,20:? "↑↑↖":POSITION 12,20:? " IMPROPER ENTRY "
EZ 1740 IF PEEK(764)<>255 OR PEEK(CONSOLE)<>7 THEN POSITION 2,20:? "↑↑↑↑":RETURN
SX 1750 GOTO 1740
XB 1760 ? CHR$(125):POSITION 10,2:? "↖ S.A.M. NOT LOADED ":POSITION 9,4:? " TURN OFF COMPUTER & "
WC 1770 POSITION 9,5:? " RE-BOOT WITH S.A.M. ":POSITION 11,8:? "THE S.A.M. EDITOR":POSITION 11,9
AK 1780 ? "CAN BE USED WITH:":POSITION 11,11:? "1-S.A.M. ALONE":POSITION 11,12:? "2-SAM & RECITER":POSITION 11,13
DC 1790 ? "3-SAM & KNOBS.SAM":POSITION 11,14:? "4-SAM & KNOBS.REC":POSITION 11,15:? "5-SAM, RECITER"
JF 1800 POSITION 13,16:? "& KNOBS.REC"
DZ 1810 POSITION 10,18:? "NOTE: DON'T USE SAM,":POSITION 10,19:? "RECITER & KNOBS.SAM"
FB 1820 POSITION 10,20:? "-OR A COMBINATION OF":POSITION 10,21:? "KNOBS.SAM & KNOBS.REC"
SS 1830 GOTO 1830
```

"price's picture painter" gets friendlier!

PICTURE SHOW

Article on page 46.

LISTING 1

```
TL 10 REM PATRICK'S PRICELESS
FB 20 REM PICTURE SHOW
TC 30 REM BY P.L. DELL'ERA
RI 40 REM ANTIC MAGAZINE
EB 70 DIM P0$(192),P1$(192),P2$(192),P3$(192),FILE$(17),FILENAME$(17),BGET$(48)
GP 80 GRAPHICS 24:POKE 710,146:POKE 712,144:FIRSTL=PEEK(560):FIRSTH=PEEK(561)
JQ 90 K=FIRSTL+FIRSTH*256+3:FIRSTSC=PEEK(88)+PEEK(89)*256
ZC 100 POKE K,206:K=K+2
RA 110 K=K+1
UO 120 IF PEEK(K)=15 THEN POKE K,14
KY 130 IF PEEK(K)=79 THEN POKE K,78:K=K+2
BU 140 IF PEEK(K)<>65 THEN 110
CQ 150 POKE 106,PEEK(106)-34
IL 160 GRAPHICS 0:SECONDL=PEEK(560):SECONDH=PEEK(561):GOSUB 1000
WM 180 REM BUILD DLI ROUTINE, BGET$
LJ 190 REM (RELOCATABLE)
YQ 210 RESTORE 1050:FOR X=1536 TO 1577:READ K:POKE X,K:NEXT X
WL 220 LET BGET$="h▘P▞0 hh▘hh▘h▘h▘D▘h▘I▘h▘H▘▞▘B▘ V▘▘▘▘▘▘"
UZ 240 REM INPUT ROUTINE
KZ 260 GOSUB 1000:POKE 82,2:POKE 752,1
YQ 270 CLOSE #2:OPEN #2,4,0,"K:"
WS 280 ? "↖↓ PATRICK'S PRICELESS PICTURE SHOW "
PX 290 CLOSE #1:OPEN #1,6,0,"D:*.*"
HB 300 TRAP 390:X=4:Y=8
DJ 310 INPUT #1,FILE$
ZW 320 IF FILE$(2,2)<>" " THEN 390
GP 330 K=3
XK 340 K=K+1:IF FILE$(K,K)<>" " AND K<11 THEN 340
ZC 350 IF FILE$(K,K)<>" " AND K=11 THEN FILENAME$=FILE$(11,13):FILE$(K)=".":FILE$(K+1)=FILENAME$:GOTO 380
RJ 360 IF FILE$(11,11)=" " THEN FILE$=FILE$(1,11):GOTO 380
ZW 370 FILE$(K,K)=".":FILE$(K+1)=FILE$(11,13)
JY 380 POSITION X,Y:PRINT FILE$(3):X=4+(X=4)*16:Y=Y+1*(X=4):GOTO 310
LA 390 TRAP 40000:CLOSE #1
ZK 400 POSITION 5,4:POKE 82,5:POKE 752,1
PX 410 ? "Please enter filename:"
BQ 420 X=9:Y=6
YH 430 FILENAME$="D1:------------":POSITION X-3,Y:? FILENAME$
YM 440 FILE$=""
SC 450 IF PEEK(764)<>255 THEN 500
XQ 460 IF PEEK(53279)<>3 THEN 450
WJ 470 GOSUB 940
DO 480 IF PEEK(53279)<>6 THEN 480
ZT 490 GOSUB 1000:GOTO 450
CF 500 GET #2,A
HR 510 IF A=155 THEN 590
OX 520 IF LEN(FILE$)=12 AND A<>ASC("4") T
```

continued on next page

```
   HEN ? "⌧":GOTO 500
DN 530 OKAY=0:IF (A>64 AND A<91) OR A=46
   OR (A>47 AND A<58) THEN OKAY=1
UU 540 IF OKAY THEN POSITION X,Y:? CHR$(A
   );:FILE$(LEN(FILE$)+1)=CHR$(A):X=X+1:G
   OTO 500
IN 550 IF A<>ASC("◄") THEN 500
WD 560 IF LEN(FILE$)=1 THEN X=9:FILE$="":
   POSITION X,Y:? #6;"-";:GOTO 500
ZV 570 IF  NOT LEN(FILE$) THEN 500
JW 580 X=X-1:POSITION X,Y:? #6;"-";:POSIT
   ION X,Y:FILE$=FILE$(1,LEN(FILE$)-1):GO
   TO 500
OL 590 FILENAME$(4)=FILE$
KM 600 TRAP 260:OPEN #1,4,0,FILENAME$:TRA
   P 40000
KE 610 X=USR(ADR(BGET$),16,FIRSTSC,7680)
DZ 620 P0=0:P1=52:P2=136:P3=162
NB 630 IF X>128 THEN 650
DG 640 GET #1,P0:GET #1,P1:GET #1,P2:GET
   #1,P3
LM 650 CLOSE #1
CE 660 P0$=CHR$(P0):P0$(192)=P0$:P0$(2)=P
   0$
HP 670 P1$=CHR$(P1):P1$(192)=P1$:P1$(2)=P
   1$
NA 680 P2$=CHR$(P2):P2$(192)=P2$:P2$(2)=P
   2$
SL 690 P3$=CHR$(P3):P3$(192)=P3$:P3$(2)=P
   3$
JH 700 X=4
DM 710 X=X+1:IF X>LEN(FILENAME$) THEN 740
HQ 720 IF FILENAME$(X,X)="." THEN 740
QG 730 IF X<12 THEN 710
RL 740 FILENAME$(X)=".P0":X=X+2:POT=ASC("
   0")
LB 750 K=ADR(P0$):GOSUB 850:POKE 1566,LO:
   POKE 1567,HI
CK 760 K=ADR(P1$):GOSUB 850:POKE 1545,LO:
   POKE 1546,HI
CW 770 K=ADR(P2$):GOSUB 850:POKE 1554,LO:
   POKE 1555,HI
TZ 780 K=ADR(P3$):GOSUB 850:POKE 1560,LO:
   POKE 1561,HI
WQ 790 GOSUB 940
YM 800 IF PEEK(53279)<>6 THEN 800
VR 810 POKE 54286,64:POKE 560,SECONDL:POK
   E 561,SECONDH:GOTO 260
QL 830 REM FILL COLOR POTS
PY 850 TRAP 870
DQ 860 OPEN #1,4,0,FILENAME$:A=USR(ADR(BG
   ET$),16,K,192)
CM 870 CLOSE #1:TRAP 40000
LB 880 POT=POT+1:FILENAME$(X,X)=CHR$(POT)
WI 890 RESTORE K:LO=PEEK(183):HI=PEEK(184
   ):RETURN
TM 910 REM INSTALL DLI, PUT PICTURE ON
QI 920 REM SCREEN
ND 940 POKE 712,P0:POKE 708,P1:POKE 709,P
   2:POKE 710,P3
FD 950 POKE 560,FIRSTL:POKE 561,FIRSTH
OY 960 POKE 512,0:POKE 513,6:POKE 54286,1
   92:POKE 559,34:RETURN
QP 980 REM TURN TEXT SCREEN ON
QL 1000 POKE 710,146:POKE 712,144:POKE 70
   9,14:POKE 752,1:? :POKE 560,SECONDL:PO
   KE 561,SECONDH:RETURN
LL 1030 REM (RELOCATABLE)
TM 1050 DATA 72,138,72,162,191,141,10,212
   ,189,204,204,141,10,212,141,22,208,189
   ,204,204,141,23,208,189,204
DS 1060 DATA 204,141,24,208,189,204,204,1
   41,26,208,202,208,226,104,170,104,64
```

LISTING 2

```
BM 10 REM PRICE PATCHED
TB 20 REM BY P.L. DELL'ERA
RH 30 REM ANTIC MAGAZINE
LV 70 GRAPHICS 0
BH 80 DIM BUF$(2427)
XD 90 OPEN #1,4,0,"D:PAINTER.EXE"
ET 100 POSITION 2,5:? "READING D:PAINTER.
   EXE ..."
VT 110 FOR X=1 TO 2427
BV 120 GET #1,BYTE
UD 130 BUF$(X,X)=CHR$(BYTE)
LT 140 NEXT X
LH 150 CLOSE #1
GF 160 POSITION 2,8:? "PATCHING ..."
ZA 170 FOR X=0 TO 15
GN 180 READ HERE,HOWMANY
XM 190 FOR Y=0 TO HOWMANY
ZP 200 READ BYTE
KC 210 BUF$(Y+HERE,Y+HERE)=CHR$(BYTE)
MA 220 NEXT Y
LS 230 NEXT X
DD 240 POSITION 2,11:? "WRITING D:PATCHED
   .EXE ..."
SL 250 OPEN #2,8,0,"D:PATCHED.EXE"
WE 260 FOR X=1 TO 2427
BW 270 PUT #2,ASC(BUF$(X,X))
MC 280 NEXT X
MC 290 CLOSE #2
NS 300 END
NE 310 DATA 366,29
JL 320 DATA 80,97,116,99,104,101
AM 330 DATA 100,32,98,121,32,80
HO 340 DATA 46,32,68,101,108,108
NW 350 DATA 39,69,114,97,32,45
WP 360 DATA 45,65,78,84,73,67
EN 370 DATA 441,3
RR 380 DATA 32,32,32,32
GH 390 DATA 482,2
MN 400 DATA 76,186,88
KR 410 DATA 492,34
JS 420 DATA 48,1,96,169,34,141
KX 430 DATA 47,2,162,96,169,12
NH 440 DATA 157,66,3,32,86,228
QQ 450 DATA 169,3,157,66,3,169
ZQ 460 DATA 204,157,68,3,169,89
US 470 DATA 157,69,3,208,38
ME 480 DATA 566,34
HI 490 DATA 76,0,89,169,0,141
DE 500 DATA 0,208,141,1,208,157
MP 510 DATA 75,3,169,12,157,74
BL 520 DATA 3,32,86,228,160,12
CO 530 DATA 169,32,153,149,87,136
NG 540 DATA 16,250,76,120,88
IQ 550 DATA 602,17
MF 560 DATA 0,169,5,157,66,3
CT 570 DATA 169,149,157,68,3,169
PJ 580 DATA 87,157,69,3,169,13
LV 590 DATA 633,19
IU 600 DATA 160,255,200,185,149,87
AB 610 DATA 201,46,240,4,201,155
WY 620 DATA 208,244,140,90,89,76
KT 630 DATA 61,89
HA 640 DATA 662,4
WF 650 DATA 162,0,189,149,87
GV 660 DATA 692,1
OK 670 DATA 144,226
FA 680 DATA 704,2
KJ 690 DATA 174,90,89
GF 700 DATA 726,2
XY 710 DATA 234,234,234
FV 720 DATA 743,2
IM 730 DATA 76,150,89
HR 740 DATA 806,5
VF 750 DATA 76,211,89,83,58,155
GN 760 DATA 843,2
IY 770 DATA 32,148,88
JO 780 DATA 2419,2
KO 790 DATA 76,154,88
HJ 800 DATA 2426,1
NX 810 DATA 154,88
```

DOT MATRIX DIGITIZER

Article on page 40.

LISTING 1

```
PY 10 REM DIGITIZER
DH 20 REM BY C. JACKSON & S. CHAPMAN
RH 30 REM ANTIC MAGAZINE
CH 40 DIM PIC$(7680),P$(80),Q$(40),J$(1),
   FN$(20)
UJ 50 ? "κName of picture- <Dev:filename>
   ":INPUT FN$
VZ 60 ? "κContrast setting--":? :? "(1) =
    Low Contrast":? "       (20 minutes to
   process)"
EH 70 ? :? "(2) = High Contrast":? "
   (60 minutes to process)":INPUT CON
BK 80 IF CON=1 OR CON=2 THEN 100
TJ 90 GOTO 60
OI 100 ? "κPut a WHITE screen in front of
    the":? "sensor, press [RETURN].":INPU
   T J$
ZM 110 LO=PADDLE(0)
OS 120 ? "κPut a BLACK screen in front
   of the":? "sensor, press [RETURN].":IN
   PUT J$
PJ 130 HI=PADDLE(0):D=(HI-LO)/15
VT 140 IF CON=2 THEN LO=SQR(LO):HI=SQR(HI
   ):D=(HI-LO)/15
RQ 150 ? "κPress [RETURN] to begin":INPUT
    J$
FW 160 CLOSE #1:OPEN #1,8,0,"P:"
RW 170 ? #1;CHR$(27);CHR$(36);CHR$(1);:RE
   M SELECT DOWNLOAD CHARACTER SET
VT 180 ? #1;CHR$(27);CHR$(51);CHR$(0);:RE
   M SET LINEFEED VALUE TO 0
LT 190 ? #1;CHR$(15);:REM CHOOSE CONDENSE
   D MODE
SR 200 ? #1;CHR$(27);CHR$(77);CHR$(1);:RE
   M SET LEFT MARGIN TO 1.
MS 210 ? #1;CHR$(27);CHR$(56);:REM DISREG
   ARD "PAPER-OUT" DETECTOR
OZ 220 ? #1;CHR$(27);CHR$(98);CHR$(1);"."
   ;
CU 230 GRAPHICS 9:AD=PEEK(88)+PEEK(89)*25
   6
GB 240 FOR B=1 TO 7680 STEP 40
PZ 250 ? #1;CHR$(27);CHR$(98);CHR$(135);"
   ⇤J";CHR$(4);".":SOUND 0,66,14,14
KE 260 FOR X=1 TO 80:P$(X,X)=CHR$(PEEK(62
   4))
WF 270 LET TIME=3*256
TO 280 NEXT X:SOUND 0,0,0,0:? #1;".";
RQ 290 C=40:V=0
DW 300 FOR N=1 TO 80 STEP 2
XB 310 IF CON=2 THEN 350
IG 320 V=16*INT((ASC(P$(N+1,N+1))-LO)/D+0
   .5)
KA 330 V=V+INT((ASC(P$(N,N))-LO)/D+0.5)
PJ 340 GOTO 370
WN 350 V=16*INT((SQR(ASC(P$(N+1,N+1)))-LO
   )/D+0.5)
DC 360 V=V+INT((SQR(ASC(P$(N,N)))-LO)/D+0
   .5)
JN 370 IF V>=256 THEN V=255
CY 380 IF V<0 THEN V=0
TG 390 V=255-V
IK 400 POKE AD+B+C-2,V
IF 410 Q$(C,C)=CHR$(V):C=C-1:NEXT N
DC 420 PIC$(B)=Q$:NEXT B
EB 430 CLOSE #1:OPEN #1,8,0,FN$
XJ 440 IO=848:AD=ADR(PIC$):ADHI=INT(AD/25
   6):ADLO=AD-ADHI*256
BO 450 POKE IO+2,11:POKE IO+4,ADLO:POKE I
   O+5,ADHI
ES 460 POKE IO+8,0:POKE IO+9,30
BR 470 K=USR(ADR("hhh☒LV⊡"),16):CLOSE #1
FQ 480 GRAPHICS 0:? FN$;" saved to disk."
YE 490 ? :? "Press [RETURN] to view pictu
   re.":INPUT J$
YO 500 OPEN #1,4,0,FN$
XI 510 GRAPHICS 9
CW 520 POKE IO+2,7:POKE IO+4,PEEK(88):POK
   E IO+5,PEEK(89)
EN 530 POKE IO+8,0:POKE IO+9,30
BM 540 K=USR(ADR("hhh☒LV⊡"),16):CLOSE #1
PL 550 GOTO 550
```

TECH TIPS

From the *ABCs of Atari Computers* by David Mentley

BUGS — A bug is an error in logic or structure of a program. The BASIC cartridge and 10K Operating System cartridge are programs which reside in ROM and can only be changed or debugged by changing the ROM chips. Atari, Inc. has provided a Revision B set of ROMs for the Operating System and the Rev. B corrects a few of the bugs. The BASIC cartridge has a few known bugs which may affect your programming. A new Revision C of the BASIC cartridge should fix most of these bugs.

1. LOG(0), CLOG(0),LOG(1),/and CLOG(1) will produce erroneous results. Almost all higher level functions will produce an approximation only because of the polynomial expansion algorithm in the floating point program.
2. The BASIC cartridge sometimes locks up during line editing.
3. A string of exactly 256 bytes will sometimes end up in a location not expected if it is moved.
4. An INPUT without a variable does not return an error when interpreted.
5. PRINT X=NOT Y will surrender control of the keyboard (lockup!).
6. Loops with LPRINT commands cannot be interrupted by BREAK.
7. A blank is usually not a problem in Atari BASIC line except when placed between a DIMmed variable and the parentheses containing the array dimension.
8. Control-R and Control-U print out as a semicolon.

SPLASH IN ACTION!

Article on page 43.

LISTING 1

```
FI 10 REM SPLASH 1
DA 12 REM BY PAUL CHABOT
RN 14 REM ANTIC MAGAZINE
UZ 20 REM MAIN LOOP
OS 22 GOSUB 200
SO 24 GOSUB 100:GOSUB 50
CX 26 POKE 656,3:POKE 657,2
SX 28 ? "[A]-Another            [C]-Clear";
GK 30 K=PEEK(764):IF K=255 THEN 30
OZ 32 POKE 764,255
LH 34 IF K=18 THEN 20
TT 36 GOTO 24
LZ 50 REM SPLASH
SA 52 POKE 712,16*INT(RND(0)*16)+2
ER 60 FOR I=0 TO 319 STEP S
NN 62 PLOT X,Y:DRAWTO I,0:PLOT X,Y
EB 64 DRAWTO I,159:NEXT I
GL 66 FOR I=0 TO 159 STEP S
HM 68 PLOT X,Y:DRAWTO 319,I:PLOT X,Y
KS 70 DRAWTO 0,I:NEXT I
AB 72 RETURN
MK 100 REM JOYSTICK
FC 102 POKE 656,3:POKE 657,2
BO 104 ? "[trigger] - SPLASH
       ";
KP 110 POKE 656,1:POKE 657,9
XE 112 ? X;" , ";Y;"  ";
YF 120 ST=STICK(0):IF STRIG(0)=0 THEN 140
NT 122 IF PEEK(764)<255 THEN POKE 764,255
   :GOSUB 150
QE 124 IF ST=15 THEN 120
YB 130 IF ST=7 AND X<319 THEN X=X+1
FO 132 IF ST=11 AND X>0 THEN X=X-1
VH 134 IF ST=13 AND Y<159 THEN Y=Y+1
KG 136 IF ST=14 AND Y>0 THEN Y=Y-1
MV 138 GOTO 110
ZF 140 RETURN
OW 150 REM INC STEP
NX 152 S=S+1:IF S>16 THEN S=1
VW 154 POKE 656,1:POKE 657,25:? S;" ";
IR 156 POKE 712,16*INT(RND(0)*16)+2
AF 158 RETURN
OK 200 REM SETUP
FB 202 GRAPHICS 8:POKE 710,0:POKE 709,14
IC 204 POKE 712,16*INT(RND(0)*16)+2
IQ 206 POKE 752,1:COLOR 1:X=120:Y=60:S=7
WS 210 ? "  GR.8           S P L A S H
   "
EC 212 ? "CENTER 120 , 60   STEP 7  "
WK 214 ? "     [joystick]       [S] "
ZI 222 RETURN
```

LISTING 2

```
;    SPLASH 2
; Paul Chabot
;
MODULE
BYTE c1=709,c2=710,bor=712,cur=752
  ,key=764,trow=656,tcol=657,y,s
CARD x

PROC Setup()
Graphics(8):c2=0:c1=14:cur=1:color=1
bor=16*Rand(16)+2:x=120:y=60:s=7
PrintE("  GR.8           S P L A S H         ")
PrintE("CENTER 120 , 60   STEP 7 ")
PrintE("     [joystick]       [S]   ")
RETURN

PROC Splash()
CARD i
bor=16*Rand(16)+2
FOR i=0 TO 319 STEP s DO
  Plot(x,y):DrawTo(i,0)
  Plot(x,y):DrawTo(i,159)
OD
FOR i=0 TO 159 STEP s DO
  Plot(x,y):DrawTo(319,i)
  Plot(x,y):DrawTo(0,i)
OD
RETURN

PROC IncStep()
s==+1:bor=16*Rand(16)+2
IF s>16 THEN s=1 FI
trow=1:tcol=25:PrintB(s):Print(" ")
RETURN

PROC Joystick()
BYTE st
trow=3:tcol=2
Print("[trigger] - SPLASH         ")
DO trow=1:tcol=9:st=Stick(0)
  PrintC(x):Print(" , "):PrintB(y):Print("  ")
  WHILE Stick(0)=15 DO
    IF Strig(0)=0 THEN RETURN FI
    IF key<255 THEN key=255:IncStep() FI
  OD st=Stick(0)
  IF st=7 AND x<319 THEN x==+1
  ELSEIF st=11 AND x>0 THEN x==-1
  ELSEIF st=13 AND y<159 THEN y==+1
  ELSEIF st=14 AND y>0 THEN y==-1
  FI
OD
RETURN

PROC Main()
DO key=255:Setup()
  DO Joystick():Splash()
    trow=3:tcol=2
    Print("[A]-Another      [C]-Clear")
    WHILE key=255 DO OD
      IF key=18 THEN EXIT FI
    key=255
  OD
OD
RETURN
```

LISTING 3

```
;  SPLASH 3
;-----------------------------------
;  Gr8
; Paul Chabot
;
MODULE
BYTE ARRAY mask=[128 64 32 16 8 4 2 1]
CARD ARRAY adrow(160)

PROC Clor(BYTE c)
BYTE i
FOR i=0 TO 7 DO
  mask(7-i)=c:c==LSH 1
OD
RETURN

PROC Dot(CARD x,BYTE y)
BYTE xb,xr
BYTE ARRAY row
  ,premask=[127 191 223 239 247 251 253 254]
xb=x RSH 3:xr=x AND 7:row=adrow(y)
row(xb)==& premask(xr) % mask(xr)
RETURN
```

```
PROC BLine(CARD x1,BYTE y1,CARD x2,BYTE y2)
BYTE y,xf,yf,j
CARD x,i
INT a,b,t,dx,dy
Dot(x1,y1):Dot(x2,y2)
IF x2>x1 THEN dx=x2-x1:xf=0
ELSE dx=x1-x2:xf=1 FI
IF y2>y1 THEN dy=y2-y1:yf=0
ELSE dy=y1-y2:yf=1 FI
IF dx<2 AND dy<2 THEN RETURN FI
x=x1:y=y1
IF dx>dy THEN a=dy+dy:t=a-dx:b=t-dx
  FOR i=2 TO dx DO
    IF xf=0 THEN x==+1 ELSE x==-1 FI
    IF t<0 THEN t==+a
    ELSE t==+b
      IF yf=0 THEN y==+1 ELSE y==-1 FI
    FI Dot(x,y)
  OD
ELSE a=dx+dx:t=a-dy:b=t-dy
  FOR j=2 TO dy DO
    IF yf=0 THEN y==+1 ELSE y==-1 FI
    IF t<0 THEN t==+a
    ELSE t==+b
      IF xf=0 THEN x==+1 ELSE x==-1 FI
    FI Dot(x,y)
  OD
FI
RETURN

PROC Gr8()
BYTE bor=710,i
CARD sa=88
Graphics(8):bor=18:adrow(0)=sa
FOR i=1 TO 159 DO
  adrow(i)=adrow(i-1)+40
OD
RETURN
;--------------------------------------
; Variant of SPLASH
;
MODULE
BYTE c1=709,c2=710,bor=712,cur=752
  ,key=764,trow=656,tcol=657,y,s
CARD x

PROC Setup()
Gr8():c2=0:c1=14:cur=1:x=120:y=60:s=7
bor=16*Rand(16)+2
PrintE("  GR.8          S P L A S H         ")
PrintE("CENTER 120 , 60   STEP 7 ")
PrintE("      [joystick]        [S] ")
RETURN

PROC Splash()
CARD i
bor=16*Rand(16)+2
FOR i=0 TO 319 STEP s DO
  BLine(x,y,i,0):BLine(x,y,i,159)
OD
FOR i=0 TO 159 STEP s DO
  BLine(x,y,0,i):BLine(x,y,319,i)
OD
RETURN

PROC IncStep()
s==+1:bor=16*Rand(16)+2
IF s>16 THEN s=1 FI
trow=1:tcol=25:PrintB(s):Print(" ")
RETURN

PROC Joystick()
BYTE st
trow=3:tcol=2
Print("[trigger] - SPLASH       ")
DO trow=1:tcol=9:st=Stick(0)
  PrintC(x):Print(" , "):PrintB(y):Print("  ")
  WHILE Stick(0)=15 DO
    IF Strig(0)=0 THEN RETURN FI
    IF key<255 THEN key=255:IncStep() FI
  OD st=Stick(0)
  IF st=7 AND x<319 THEN x==+1
  ELSEIF st=11 AND x>0 THEN x==-1
  ELSEIF st=13 AND y<159 THEN y==+1
  ELSEIF st=14 AND y>0 THEN y==-1
  FI
OD
RETURN

PROC Main()
DO key=255:Setup()
  DO Joystick():Splash()
    trow=3:tcol=2
    Print("[A]-Another      [C]-Clear")
    WHILE key=255 DO OD
      IF key=18 THEN EXIT FI
    key=255
  OD
OD
RETURN
```

LISTING 4

```
;  SPLASH4
;--------------------------------------
;  Gr7plus
; Paul Chabot
;
MODULE
BYTE ARRAY mask=[64 16 4 1]
CARD ARRAY adrow(160)

PROC Clor(BYTE c)
mask(3)=c:mask(2)=c LSH 2
mask(1)=c LSH 4:mask(0)=c LSH 6
RETURN

PROC Dot(BYTE x,y)
BYTE xb,xr
BYTE ARRAY row
  ,premask=[63 207 243 252]
xb=x RSH 2:xr=x AND 3:row=adrow(y)
row(xb)==& premask(xr) % mask(xr)
RETURN

PROC BLine(BYTE x1,y1,x2,y2)
BYTE x,y,xf,yf,i
INT a,b,t,dx,dy
Dot(x1,y1):Dot(x2,y2)
IF x2>x1 THEN dx=x2-x1:xf=0
ELSE dx=x1-x2:xf=1 FI
IF y2>y1 THEN dy=y2-y1:yf=0
ELSE dy=y1-y2:yf=1 FI
IF dx<2 AND dy<2 THEN RETURN FI
x=x1:y=y1
IF dx>dy THEN a=dy+dy:t=a-dx:b=t-dx
  FOR i=2 TO dx DO
    IF xf=0 THEN x==+1 ELSE x==-1 FI
    IF t<0 THEN t==+a
    ELSE t==+b
      IF yf=0 THEN y==+1 ELSE y==-1 FI
    FI Dot(x,y)
  OD
ELSE a=dx+dx:t=a-dy:b=t-dy
  FOR i=2 TO dy DO
    IF yf=0 THEN y==+1 ELSE y==-1 FI
    IF t<0 THEN t==+a
    ELSE t==+b
      IF xf=0 THEN x==+1 ELSE x==-1 FI
    FI Dot(x,y)
  OD
FI
RETURN

PROC Gr7plus()
BYTE i
BYTE ARRAY dl
CARD sa=88,dlist=560
Graphics(8):adrow(0)=sa
FOR i=1 TO 159 DO
  adrow(i)=adrow(i-1)+40
OD
dl=dlist:dl(3)=78:dl(99)=78
FOR i=6 TO 98 DO dl(i)=14 OD
FOR i=102 TO 166 DO dl(i)=14 OD
RETURN
;--------------------------------------
; COLOR SPLASH
;
MODULE
BYTE cur=752,key=764,trow=656,tcol=657
  ,x,y,s,c,i,j
BYTE ARRAY creg=708
```

continued on next page

```
  ,dfault=[54 26 194 0 80]

PROC Splash()
FOR i=0 TO 159 STEP s DO
  BLine(x,y,i,0):BLine(x,y,i,159)
  BLine(x,y,0,i):BLine(x,y,159,i)
OD
RETURN

PROC IncStep()
s==+1:IF s>16 THEN s=1 FI
trow=1:tcol=26:PrintB(s):Print(" ")
RETURN

PROC IncColor()
i=c:c==+1
IF c>3 THEN c=0:i=4 FI
Clor(c):i=creg(i)
trow=1:tcol=37:PrintB(c):Print(" ")
trow=2:tcol=36:PrintB(i RSH 4):Print(" ")
trow=3:tcol=36:PrintB(i & 14):Print(" ")
RETURN

PROC IncHue()
IF c=0 THEN i=4 ELSE i=c-1 FI
j=creg(i) RSH 4:j==+1
IF j>15 THEN j=0 FI
trow=2:tcol=36:PrintB(j):Print(" ")
creg(i)=(j LSH 4)+(creg(i) & 14)
RETURN

PROC IncLum()
IF c=0 THEN i=4 ELSE i=c-1 FI
j=creg(i) & 14:j==+2
IF j>15 THEN j=0 FI
trow=3:tcol=36:PrintB(j):Print(" ")
creg(i)=(creg(i) & 240)+j
RETURN

PROC Joystick()
BYTE st,k
DO trow=1:tcol=9
  PrintC(x):Print(" , "):PrintB(y):Print(" ")
  WHILE Stick(0)=15 DO
    IF Strig(0)=0 THEN Splash() FI
    IF key<255 THEN k=key:key=255
      IF k=62 THEN IncStep()        ;S
      ELSEIF k=18 THEN IncColor()   ;C
      ELSEIF k=57 THEN IncHue()     ;H
      ELSEIF k=0 THEN IncLum()      ;L
      ELSEIF k=35 THEN RETURN       ;N
      FI
    FI
  OD st=Stick(0)
  IF st=7 AND x<159 THEN x==+1
  ELSEIF st=11 AND x>0 THEN x==-1
  ELSEIF st=13 AND y<159 THEN y==+1
  ELSEIF st=14 AND y>0 THEN y==-1
   FI
OD
RETURN

PROC Setup()
Gr7Plus():cur=1
FOR i=0 TO 4 DO creg(i)=dfault(i) OD
PrintE("  Gr7Plus        S P L A S H       ")
PrintE("CENTER 80 , 60   [S]tep 7   [C]OLOR")
PrintE("      [joystick]                [H]ue")
Print("[trig]-SPLASH  [N]ew Screen [L]UM")
x=80:y=60:s=7:c=0:IncColor()
RETURN

PROC OpenScene()
Setup():x=20:y=20:s=9:Splash()
IncColor():x=50:y=110:s=7:Splash()
IncColor():x=120:y=60:s=9:Splash()
IncColor():x=80:y=130:s=9:Splash()
IncColor():x=140:y=130:s=7:Splash()
RETURN

PROC Main()
OpenScene():Joystick()
DO Setup():Joystick() OD
RETURN
```

syncalc tax preparation follow-up!

84 TAX SPREADSHEET UPDATE

Article on page 34.

TABLE X

	A	B	C
66	SCHEDULE X SINGLE		
67	2,300	0	0.11
68	3,400	121	0.12
69	4,400	241	0.14
70	6,500	535	0.15
71	8,500	835	0.16
72	10,800	1,203	0.18
73	12,900	1,581	0.20
74	15,000	2,001	0.23
75	18,200	2,737	0.26
76	23,500	4,115	0.30
77	28,800	5,705	0.34
78	34,100	7,507	0.38
79	41,500	10,319	0.42
80	55,300	16,115	0.48
81	81,800	28,835	0.50

TABLE Y

	A	B	C
82	SCHEDULE Y MARRIED		
83	1	0	0.00
84	3,400	0	0.11
85	5,500	231	0.12
86	7,600	483	0.14
87	11,900	1,085	0.16
88	16,000	1,741	0.18
89	20,200	2,497	0.22
90	24,600	3,465	0.25
91	29,900	4,790	0.28
92	35,200	6,274	0.33
93	45,800	9,772	0.38
94	60,000	15,168	0.42
95	85,600	25,920	0.45
96	109,400	36,630	0.49
97	162,400	62,600	0.50

TABLE Y

```
         A          B        C
 98SCHEDULE Y SEPARATE
 99        1        Ø     Ø.ØØ
1ØØ    1,7ØØ        Ø     Ø.11
1Ø1    2,75Ø      116     Ø.12
1Ø2    3,8ØØ      242     Ø.14
1Ø3    5,95Ø      543     Ø.16
1Ø4    8,ØØØ      871     Ø.18
1Ø5   1Ø,1ØØ    1,249     Ø.22
1Ø6   12,3ØØ    1,733     Ø.25
1Ø7   14,95Ø    2,395     Ø.28
1Ø8   17,6ØØ    3,137     Ø.33
1Ø9   22,9ØØ    4,886     Ø.38
11Ø   3Ø,ØØØ    7,584     Ø.42
111   42,8ØØ   12,96Ø     Ø.45
112   54,7ØØ   18,315     Ø.49
113   81,2ØØ   31,3ØØ     Ø.5Ø
```

TABLE Z

```
         A          B        C
114SCHEDULE Z HEAD OF HO
115        1        Ø     Ø.ØØ
116    2,3ØØ        Ø     Ø.11
117    4,4ØØ      231     Ø.12
118    6,5ØØ      483     Ø.14
119    8,7ØØ      791     Ø.17
12Ø   11,8ØØ    1,318     Ø.18
121   15,ØØØ    1,894     Ø.2Ø
122   18,2ØØ    2,534     Ø.24
123   23,5ØØ    3,8Ø6     Ø.28
124   28,8ØØ    5,29Ø     Ø.32
125   34,1ØØ    6,986     Ø.35
126   44,7ØØ   1Ø,696     Ø.42
127   6Ø,6ØØ   17,374     Ø.45
128   81,8ØØ   26,914     Ø.48
1291Ø8,3ØØ   39,634     Ø.5Ø
```

SCHEDULE G

```
     -- A --** B **-- C --** D **--- E ---

188 SCHEDULE G INCOME AVERAGING
189 1 '81 1Ø4Ø L 34                       Ø
19Ø 4 '82 1Ø4Ø L 37                       Ø
191 3 '83 1Ø4Ø L 37                       Ø
192 4 OUTSIDE US INCOME 81-83             Ø
193 5      TOTAL INCOME                  $Ø
194 6   DIVIDE BY 3                       Ø
195 7   MULTIPLY BY 1.4                   Ø
196 8   84 INCOME 1Ø4Ø L37                Ø
197 9   PREMATURE DISTRIBUTION            Ø
198 1Ø   NET OF DISTRIBUTION              Ø
199 11   COMMUNITY STATE                  Ø
2ØØ 12   NET OF LINES 11 & 1Ø             Ø
2Ø1 13   1.4 FROM LINE 7                  Ø
2Ø2 14   AVERAGABLE INCOME               $Ø
2Ø3 15   25% OF AVERAGABLE INCOME         Ø
2Ø4 16   AMOUNT ON LINE 7                 Ø
2Ø5 17   TOTAL OF LINES 15 & 16           Ø
2Ø6 18   AMOUNT ON LINE 11                Ø
2Ø7 19   TOTAL OF LINES 17 & 18           Ø
2Ø8 2Ø   TAX ON LINE 19                   Ø
2Ø9 21   TAX ON LINE 17             Ø
21Ø 22   TAX ON LINE 16             Ø
211 23   NET LINES 21 & 22          Ø
212 24   3ØØ% OF LINE 23                  Ø
213 25   TAX ON LINE 8              Ø
214 26&27 TAX ON LINE 1Ø            Ø     Ø
215 28   SCH G TAX TO 1Ø4Ø,LN 38         $Ø
```

FORMULAE FOR SCHEDULE G

```
D2Ø9 E72+E89+E1Ø5+E121
D21Ø E73+E9Ø+E1Ø6+E122
D211 D2Ø9-D21Ø
D213 E74+E91+E1Ø7+E123
D214 E75+E92+E1Ø8+E124
E193 @SUM(E191:E189)+E192
E194 E193/3
E195 E194*1.4
E196 E43
E198 E196-E197
E2ØØ @IF E198-E199>Ø THEN
 E198-E199 ELSE Ø
E2Ø1 E195
E2Ø2 @IF E2Ø1>Ø THEN E2ØØ
-E2Ø1 ELSE Ø
E2Ø3 Ø.25*E2Ø2
E2Ø4 E195
E2Ø5 E2Ø4+E2Ø3
E2Ø6 E199
E2Ø7 E2Ø6+E2Ø5
E2Ø8 E71+E88+E1Ø4+E12Ø
E212 3*D211
E214 D213-D214
E215 @IF E2Ø2<3ØØ1 THEN Ø
 ELSE E214+E212+E2Ø8
```

To order 1984 Tax Disk — with 6 additional forms — see advertisement on page 83.



MANEUVER

Article on page 55.

LISTING 1

```
JJ 5 REM MANEUVER
WT 6 REM BY WILL WOODARD
QO 7 REM ANTIC MAGAZINE
DG 10 DIM A$(240),BYTE$(80),B$(1),C$(1),D
   $(1),PLARR(12,9),PP(12)
MZ 15 GRAPHICS 2
VT 20 VTABLE=PEEK(134)+256*PEEK(135)
ZY 30 SCREENRAM=PEEK(88)+256*PEEK(89)
TJ 40 OFFSET=SCREENRAM-ADR(A$)
EI 50 V3=INT(OFFSET/256)
IV 60 V2=OFFSET-256*V3
QJ 70 POKE VTABLE+2,V2
RW 72 POKE VTABLE+3,V3
OS 74 POKE 756,226
MB 76 SETCOLOR 0,7,2:SETCOLOR 1,3,2:SETCO
   LOR 2,0,6:SETCOLOR 3,12,4:SETCOLOR 4,0
   ,0
HK 77 FOR A=1 TO 240 STEP 3:A$(A)="▬":A$(
   A+1)="+":A$(A+2)="▮":NEXT A
PH 78 READ A,B,C,B$:IF A<>-1 THEN D$=A$(A
   -C,A-C)
WU 79 IF A<>-1 THEN FOR I=A TO B STEP C:C
   $=A$(I,I):A$(I,I)=B$:A$(I-C,I-C)=D$:SO
   UND 0,I,10,8:SOUND 1,I,8,2:D$=C$
QA 80 IF A<>-1 THEN NEXT I:GOTO 78
OY 81 SOUND 0,0,0,0:SOUND 1,0,0,0
NT 82 DATA 210,30,-20,e,40,31,-1,u,29,29,
   1,n,212,32,-20,v,21,28,1,a,33,33,20,e,
   2,27,1,m,59,34,-1,r,-1,-1,-1,f
BR 90 OPEN #1,4,0,"K:"
SW 100 GOSUB 30000
II 350 TURN=1
GP 355 FOR PLY=0 TO 1
WL 400 ? :? :? :? :FOR PIECE=1 TO NOPLY:?
    "Enter orders for blinking player"
LP 404 IF PLARR(PIECE+(NOPLY*PLY),8)=0 TH
   EN 430
RB 405 PPOS=PP(PIECE+(NOPLY*PLY)):B$=A$(P
   POS,PPOS)
PL 410 FOR I=1 TO 10:SOUND 0,47,10,8:A$(P
   POS,PPOS)="⁙":FOR D=1 TO 25:NEXT D:A$(
   PPOS,PPOS)=B$:FOR D=1 TO 25:NEXT D
UH 415 SOUND 0,0,0,0:NEXT I
FO 420 FOR J=1 TO PLARR(PIECE+(NOPLY*PLY)
   ,6):GET #1,MOVE:PLARR(PIECE+(NOPLY*PLY
   ),J)=MOVE:? CHR$(MOVE);:NEXT J
RE 425 GOSUB 1000
LP 426 IF OK=0 THEN ? :? :? :? :? "▢ERROR
    IN ORDERS...":FOR D=1 TO 200:NEXT D:P
   IECE=PIECE-1
TG 430 ? :? :? :? :? :NEXT PIECE
EN 435 NEXT PLY
PB 540 ? :? :? :? :? "GREEN DAMAGE: ●:";P
   LARR(1,8);" ♠:";PLARR(2,8);" ♥:";PLARR
   (3,8)
CG 550 ? "RED    DAMAGE: ●:";PLARR(4,8);"
   ♠:";PLARR(5,8);" ♥:";PLARR(6,8)
NS 600 FOR I=1 TO 5
BB 605 FOR J=1 TO NOPLY
DZ 607 IF TURN=1 THEN PLY=0:GOSUB 632:PLY
   =1:GOSUB 634
CW 609 IF TURN=2 THEN PLY=1:GOSUB 634:PLY
   =0:GOSUB 632
GM 630 NEXT J
NU 631 NEXT I:GOTO 639
GU 632 IF PLARR(J+(NOPLY*PLY),8)=0 THEN R
   ETURN
QQ 633 GOSUB PLARR(J+(NOPLY*PLY),I)*100:S
   OUND 0,0,0,0:RETURN
HA 634 IF PLARR(J+(NOPLY*PLY),8)=0 THEN R
   ETURN
QW 635 GOSUB PLARR(J+(NOPLY*PLY),I)*100:S
   OUND 0,0,0,0:RETURN
IW 639 TURN=TURN+1:IF TURN=3 THEN TURN=1
PC 640 ? :? :? :? :? "GREEN DAMAGE: ●:";P
   LARR(1,8);" ♠:";PLARR(2,8);" ♥:";PLARR
   (3,8)
CH 650 ? "RED    DAMAGE: ●:";PLARR(4,8);"
   ♠:";PLARR(5,8);" ♥:";PLARR(6,8)
SD 660 ? "Press any key to continue..":GE
   T #1,Z
QR 700 GOTO 355
OS 1000 OK=1:OK2=0
XL 1005 FOR I=1 TO PLARR(PIECE+(NOPLY*PLY
   ),6)
KP 1010 B$=CHR$(PLARR(PIECE+(NOPLY*PLY),I
   ))
RA 1020 IF (B$<>"N" AND B$<>"S" AND B$<>"
   E" AND B$<>"W") THEN OK2=1
HO 1025 IF (OK2 AND B$<>"1" AND B$<>"2" A
   ND B$<>"3" AND B$<>"4" AND B$<>"-") TH
   EN OK=0
EY 1030 NEXT I
DC 1999 RETURN
OE 4500 FOR D=1 TO 100:NEXT D:RETURN
OT 4550 FOR D=1 TO 100:NEXT D:RETURN
JX 4900 DIS=0:GOSUB 26000:FOR K=PP(J+(3*P
   LY))-20 TO PP(J+(3*PLY))-20-(PLARR(J+(
   3*PLY),7)*20) STEP -20
RA 4902 DIS=DIS+1
OL 4904 IF K<=67 THEN POP :GOTO 4940
FS 4910 B$=A$(K,K):IF B$="T" OR B$="▮" OR
    B$="♠" OR B$="◘" OR B$="e" OR B$="◙"
   THEN POP :GOTO 4925
NS 4915 A$(K,K)="▮":C$=A$(K+20,K+20)
RK 4920 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   ◙" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K+20,K+20)="⁙"
GU 4922 NEXT K
VM 4923 GOTO 4940
EQ 4925 B$=A$(K+20,K+20)
HW 4926 IF B$<>"▮" AND B$<>"◘" AND B$<>"◙
   " AND B$<>"T" AND B$<>"e" AND B$<>"♠"
   THEN A$(K+20,K+20)="⁙"
FM 4927 B$=A$(K,K):FOR L=64 TO 95:A$(K,K)
   =CHR$(L):SOUND 0,L,10,8:SOUND 0,0,0,0:
   NEXT L
JE 4930 A$(K,K)=B$
BN 4932 GOSUB 9000
BX 4935 RETURN
EI 4940 C$=A$(K+20,K+20)
RY 4942 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   ◙" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K+20,K+20)="⁙"
CA 4945 RETURN
JC 5000 DIS=0:GOSUB 26000:FOR K=PP(J+(3*P
   LY))+1 TO PP(J+(3*PLY))+1+PLARR(J+(3*P
   LY),7)
QJ 5002 DIS=DIS+1
SU 5004 IF (INT(K/10))/2<>INT(INT(K/10)/2
   ) AND K-(INT(K/10)*10)>=4 THEN POP :GO
   TO 5040
CK 5010 B$=A$(K,K):IF B$="T" OR B$="▮" OR
    B$="♠" OR B$="◘" OR B$="e" OR B$="◙"
   THEN POP :GOTO 5025
ZY 5020 A$(K,K)="⁚":C$=A$(K-1,K-1)
```

```
NR 5021 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   @" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K-1,K-1)=":::"
GD 5022 NEXT K
RC 5023 GOTO 5040
AO 5025 B$=A$(K-1,K-1):IF B$<>"▮" AND B$<
   >"◘" AND B$<>"@" AND B$<>"T" AND B$<>"
   e" AND B$<>"♠" THEN A$(K-1,K-1)=":::"
EV 5027 B$=A$(K,K):FOR L=64 TO 95:A$(K,K)
   =CHR$(L):SOUND 0,L,10,8:SOUND 0,0,0,0:
   NEXT L
IN 5030 A$(K,K)=B$
AW 5032 GOSUB 9000
BG 5035 RETURN
GV 5040 C$=A$(K-1,K-1)
NX 5041 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   @" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K-1,K-1)=":::"
BJ 5045 RETURN
IE 5100 DIS=0:GOSUB 26000:FOR K=PP(J+(3*P
   LY))+20 TO PP(J+(3*PLY))+20+(PLARR(J+(
   3*PLY),7)*20) STEP 20
QL 5102 DIS=DIS+1
BT 5104 IF K>=174 THEN POP :GOTO 5140
GB 5110 B$=A$(K,K):IF B$="T" OR B$="▮" OR
    B$="♠" OR B$="◘" OR B$="e" OR B$="@"
   THEN POP :GOTO 5125
QS 5120 A$(K,K)="▮":C$=A$(K-20,K-20)
EX 5121 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   @" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K-20,K-20)=":::"
GF 5122 NEXT K
RQ 5123 GOTO 5140
GL 5125 B$=A$(K-20,K-20)
UX 5126 IF B$<>"▮" AND B$<>"◘" AND B$<>"@
   " AND B$<>"T" AND B$<>"e" AND B$<>"♠"
   THEN A$(K-20,K-20)=":::"
EX 5127 B$=A$(K,K):FOR L=64 TO 95:A$(K,K)
   =CHR$(L):SOUND 0,L,10,8:SOUND 0,0,0,0:
   NEXT L
IP 5130 A$(K,K)=B$
AY 5132 GOSUB 9000
BI 5135 RETURN
GD 5140 C$=A$(K-20,K-20)
FD 5141 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   @" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K-20,K-20)=":::"
BL 5145 RETURN
JB 5200 DIS=0:GOSUB 26000:FOR K=PP(J+(3*P
   LY))-1 TO PP(J+(3*PLY))-1-PLARR(J+(3*P
   LY),7) STEP -1
QN 5202 DIS=DIS+1
UL 5204 IF (INT(K/10))/2=INT(INT(K/10)/2)
    AND K-(INT(K/10)*10)<=7 THEN POP :GOT
   O 5240
JS 5210 B$=A$(K,K):IF B$="T" OR B$="▮" OR
    B$="♠" OR B$="◘" OR B$="e" OR B$="@"
   THEN POP :GOTO 5225
VY 5220 A$(K,K)="R":C$=A$(K+1,K+1)
ZZ 5221 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   @" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K+1,K+1)=":::"
GH 5222 NEXT K
SE 5223 GOTO 5240
IO 5225 B$=A$(K+1,K+1):IF B$<>"▮" AND B$<
   >"◘" AND B$<>"@" AND B$<>"T" AND B$<>"
   e" AND B$<>"♠" THEN A$(K+1,K+1)=":::"
EZ 5227 B$=A$(K,K):FOR L=64 TO 95:A$(K,K)
   =CHR$(L):SOUND 0,L,10,8:SOUND 0,0,0,0:
   NEXT L
IR 5230 A$(K,K)=B$
BA 5232 GOSUB 9000
BK 5235 RETURN
ER 5240 C$=A$(K+1,K+1)
AF 5241 IF (C$<>"▮" AND C$<>"◘" AND C$<>"
   @" AND C$<>"T" AND C$<>"e" AND C$<>"♠"
   ) THEN A$(K+1,K+1)=":::"
BN 5245 RETURN
NI 6400 PLARR(6,8)=PLARR(6,8)-DAM
AQ 6403 IF PLARR(6,8)<=0 THEN FOR SO=1 TO
    25:SOUND 0,RND(0)*80+50,10,8:A$(PP(6)
   ,PP(6))=CHR$(RND(0)*225):NEXT SO
ID 6405 SOUND 0,0,0,0
AP 6410 RETURN
WG 6900 PPOS=PP(J+(NOPLY*PLY)):B$=A$(PPOS
   ,PPOS)
RK 6902 C$=A$(PPOS+1,PPOS+1):IF C$="T" OR
    C$="▮" OR C$="♠" OR C$="◘" OR C$="e"
   OR C$="@" THEN 6920
IC 6903 IF C$="♦" OR C$="◘" OR C$="Y" OR
   C$="Y" THEN 6920
LO 6904 IF C$=":I" THEN 6920
ZQ 6910 A$(PPOS,PPOS)=":::":A$(PPOS+1,PPOS+
   1)=B$
ET 6915 PP(J+(NOPLY*PLY))=PP(J+(NOPLY*PLY
   ))+1
BC 6920 RETURN
WF 7800 PPOS=PP(J+(NOPLY*PLY)):B$=A$(PPOS
   ,PPOS)
EP 7801 C$=A$(PPOS-20,PPOS-20)
AQ 7802 IF C$="T" OR C$="▮" OR C$="♠" OR
   C$="◘" OR C$="e" OR C$="@" OR C$="Y" O
   R C$="Y" THEN 7820
IA 7803 IF C$="♦" OR C$="◘" OR C$="Y" OR
   C$="Y" THEN 7820
WD 7804 C$=A$(PP(J+(NOPLY*PLY))-20):IF C$
   ="▬" THEN 7820
VR 7810 A$(PPOS,PPOS)=":::":A$(PPOS-20,PPOS
   -20)=B$
KW 7815 PP(J+(NOPLY*PLY))=PP(J+(NOPLY*PLY
   ))-20
BB 7820 RETURN
VW 8300 PPOS=PP(J+(NOPLY*PLY)):B$=A$(PPOS
   ,PPOS)
RA 8302 C$=A$(PPOS+20,PPOS+20):IF C$="T"
   OR C$="▮" OR C$="♠" OR C$="◘" OR C$="e
   " OR C$="@" THEN 8320
ZQ 8303 IF C$="♦" OR C$="◘" OR C$="Y" OR
   C$="Y" THEN 8320
RS 8304 IF C$="▬" THEN 8320
PY 8310 A$(PPOS,PPOS)=":::":A$(PPOS+20,PPOS
   +20)=B$
HJ 8315 PP(J+(NOPLY*PLY))=PP(J+(NOPLY*PLY
   ))+20
AS 8320 RETURN
KS 8400 PLARR(4,8)=PLARR(4,8)-DAM
NO 8403 IF PLARR(4,8)<=0 THEN FOR SO=1 TO
    25:SOUND 0,RND(0)*80+50,10,8:A$(PP(4)
   ,PP(4))=CHR$(RND(0)*225):NEXT SO
IF 8405 SOUND 0,0,0,0
AR 8410 RETURN
WE 8700 PPOS=PP(J+(NOPLY*PLY)):B$=A$(PPOS
   ,PPOS)
UG 8702 C$=A$(PPOS-1,PPOS-1):IF C$="T" OR
    C$="▮" OR C$="♠" OR C$="◘" OR C$="e"
   OR C$="@" THEN 8720
HY 8703 IF C$="♦" OR C$="◘" OR C$="Y" OR
   C$="Y" THEN 8720
JX 8704 IF C$=":I" THEN 8720
EW 8710 A$(PPOS,PPOS)=":::":A$(PPOS-1,PPOS-
   1)=B$
HV 8715 PP(J+(NOPLY*PLY))=PP(J+(NOPLY*PLY
   ))-1
BA 8720 RETURN
OT 9000 CH=RND(0)*10:IF CH>5 THEN CHANCE=
   RND(1):GOTO 9002
RQ 9001 CHANCE=-RND(1)
TZ 9002 DAM=PLARR(J+(3*PLY),9)*(1/DIS)+CH
   ANCE
AS 9003 DAM=INT(DAM*100):DAM=DAM/100
IG 9005 GOSUB ASC(B$)*100
KW 9006 FOR X=1 TO 3:IF PLARR(X+(3*PLY),8
   )<=0 THEN PLARR(X+(3*PLY),8)=0:A$(PP(X
   +(3*PLY)),PP(X+(PLY*3)))=":::"
MM 9008 NEXT X
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continued on next page

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LJ 9014 IF PLARR(2,8)<=0 THEN GOTO 10000
UE 9015 IF PLARR(5,8)<=0 THEN GOTO 10050
JR 9017 ? :? :? :? :? "GREEN DAMAGE: ♠:";
   PLARR(1,8);" ♣:";PLARR(2,8);" ♥:";PLAR
   R(3,8)
VI 9020 ? "RED   DAMAGE: ♠:";PLARR(4,8);"
    ♣:";PLARR(5,8);" ♥:";PLARR(6,8)
CD 9049 RETURN
AA 10000 FOR I=100 TO 40 STEP -1:SOUND 0,
   I,10,8:SOUND 1,I+17,10,8
HB 10031 SETCOLOR 0,I,4:SETCOLOR 4,I+17,4
MV 10032 SOUND 2,140-I,10,8:SOUND 3,140-I
   -17,10,8:NEXT I
IM 10035 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUN
   D 2,0,0,0:SOUND 3,0,0,0
LK 10037 SETCOLOR 0,3,2:SETCOLOR 4,3,2
HO 10040 ? :? :? "RED VICTORY":? "Do you
   wish to play again? <Y/N>":GET #1,ANS:
   IF ANS=89 THEN RUN
AL 10049 GRAPHICS 0:END
FD 10050 FOR I=200 TO 140 STEP -1:SOUND 0
   ,I,10,8:SOUND 1,I+17,10,8
HV 10081 SETCOLOR 0,I,4:SETCOLOR 4,I+17,4
PM 10082 SOUND 2,240-I,10,8:SOUND 3,240-I
   -17,10,8:NEXT I
JG 10085 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUN
   D 2,0,0,0:SOUND 3,0,0,0
EG 10087 SETCOLOR 0,12,4:SETCOLOR 4,12,4
ER 10090 ? :? :? "GREEN VICTORY":? "Do yo
   u wish to play again? <Y/N>":INPUT B$:
   IF B$="Y" THEN RUN
BF 10099 GRAPHICS 0:END
DJ 12300 PLARR(5,8)=PLARR(5,8)-DAM:RETURN
BU 19200 PLARR(3,8)=PLARR(3,8)-DAM
QL 19203 IF PLARR(3,8)<=0 THEN FOR SO=1 T
   O 25:SOUND 0,RND(0)*80+50,10,8:A$(PP(3
   ),PP(3))=CHR$(RND(0)*225):NEXT SO
WA 19205 SOUND 0,0,0,0
DZ 19210 RETURN
YJ 21200 PLARR(1,8)=PLARR(1,8)-DAM
CM 21203 IF PLARR(1,8)<=0 THEN FOR SO=1 T
   O 25:SOUND 0,RND(0)*80+50,10,8:A$(PP(1
   ),PP(1))=CHR$(RND(0)*225):NEXT SO
VL 21205 SOUND 0,0,0,0
DK 21210 RETURN
ZD 25100 PLARR(2,8)=PLARR(2,8)-DAM:RETURN
EV 26000 SOUND 0,100,8,8:RETURN
KS 26010 SOUND 0,145,8,8:RETURN
MS 26100 SOUND 0,0,0,0:SOUND 1,0,0,0
QP 30000 A$(47,54)="┌────────┐"
ID 30010 A$(67,74)="|▣═══════|"
IK 30020 A$(87,94)="|══════:T:|"
RH 30030 A$(107,114)="|▣═══════|"
PL 30040 A$(127,134)="|══════:♣:|"
ZY 30050 A$(147,154)="|▣═══════|"
MT 30060 A$(167,174)="|══════:e:|"
NF 30070 A$(187,194)="└────────┘"
WU 30075 NOPLY=3
NH 30080 FOR I=1 TO 3:READ X:PP(I)=X:NEXT
    I
XE 30090 FOR I=1 TO 3:READ X:PP(I+3)=X:NE
   XT I
RV 30110 DATA 68,108,148,93,133,173
IP 30120 FOR I=1 TO 3:READ W,X,Y,Z:PLARR(
   I,6)=W:PLARR(I,7)=X:PLARR(I,8)=Y:PLARR
   (I,9)=Z
ZW 30130 PLARR(I+3,6)=W:PLARR(I+3,7)=X:PL
   ARR(I+3,8)=Y:PLARR(I+3,9)=Z:NEXT I
AV 30140 DATA 5,5,13,3,5,2,20,5,5,3,17,5
DW 30150 RETURN
CZ 32600 GRAPHICS 0:INPUT S,E
FO 32615 GRAPHICS 0:? :?
KK 32620 ? S:S=S+1
QJ 32625 ? "CONT":POSITION 0,0:POKE 842,1
   3:STOP
QQ 32630 POKE 842,12:IF S<=E THEN 32615
AL 32635 GRAPHICS 0:END
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bonus game

CRAZY EIGHTS!

Article on page 56.

LISTING 1

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ZO 10 REM CRAZY EIGHTS
MC 20 REM BY PRINCETON CHAN
RH 30 REM ANTIC MAGAZINE
BT 60 GRAPHICS 0:POKE 752,1:DIM CARD(52),
   CARD1(52),HAND1(18),HAND2(18),TYPE1(18
   ),TYPE2(18),CHOICE$(2),CHAR$(28)
XU 65 FOR X=1 TO 18:HAND1(X)=0:NEXT X
MT 70 RESTORE :DL=PEEK(560)+PEEK(561)*256
   :POKE 710,0:POKE 512,0:POKE 513,6:POKE
    54286,192:POKE 559,0
SR 80 FOR L=0 TO 10:READ D:POKE 1536+L,D:
   NEXT L
RE 90 PMBASE=PEEK(106)-8:CHBASE=PMBASE-4:
   POKE 54279,PMBASE:POKE 53248,52:POKE 5
   3256,3
HP 100 POKE 704,0:PMBASE=PMBASE*256:FOR L
   =PMBASE+512 TO PMBASE+1024:POKE L,0:NE
   XT L
ES 110 FOR L=PMBASE+597 TO PMBASE+622:REA
   D D:POKE L,D:NEXT L
OA 120 POKE 203,0:POKE 204,CHBASE:POKE 75
   6,CHBASE:FOR L=1 TO 28:READ D:CHAR$(L)
   =CHR$(D):NEXT L:L=USR(ADR(CHAR$))
GA 130 CHBASE=CHBASE*256:FOR L=CHBASE+776
    TO CHBASE+791:READ D:POKE L,D:NEXT L
XF 140 DATA 72,169,148,141,10,212,141,24,
   208,104,64
BF 150 DATA 254,254,254,130,130,130,130,1
   30,130,130,130,130,130,130,130,130,130
   ,130,130,130,130,130,130,254,254,254
VS 160 DATA 104,169,0,133,205,168,169,224
   ,133,206,177,205,145,203,200,208,249,2
   30,204,230,206,165,206,201,228
UW 170 DATA 208,239,96
AT 180 DATA 85,85,85,85,85,85,85,85,170,1
   70,170,170,170,170,170,170
JC 190 FOR L=1 TO 23:FOR L1=2 TO 38 STEP
   2:POSITION L1,L:? "ab";:NEXT L1:NEXT L
AO 200 POSITION 14,10:? "CRAZY EIGHTS":PO
   SITION 15,12:? "CREATED BY":POSITION 1
   3,14:? "PRINCETON CHAN":POKE 559,46
SJ 210 COUNT1=0:COUNT2=0:COUNT=4:DECK=52:
   POKE 82,8
EV 220 FOR L=1 TO 52:CARD(L)=0:CARD1(L)=0
   :NEXT L:FOR L=1 TO 13:HAND1(L)=0:HAND2
   (L)=0:TYPE1(L)=0
YU 230 TYPE2(L)=0:NEXT L
QA 240 FOR L=1 TO 13:FOR L1=1 TO 4
EZ 250 A=INT(RND(0)*52)+1:IF CARD(A)<>0 T
   HEN 250
ZZ 260 CARD(A)=L:CARD1(A)=COUNT:COUNT=COU
   NT-1:NEXT L1:COUNT=4:NEXT L
AQ 270 ? "↖":FOR L=5 TO 11 STEP 6:FOR L1=
   1 TO 38 STEP 2:POSITION L1,L:? "ab";:N
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   EXT L1:NEXT L
UD 280 FOR L1=1 TO 5:COUNT1=COUNT1+1:HAND
   1(L1)=CARD(DECK):TYPE1(L1)=CARD1(DECK)
   :DECK=DECK-1
LT 290 VALUE=COUNT1:GOSUB 1210:VALUE=HAND
   1(L1):VALUE1=TYPE1(L1):GOSUB 850:NEXT
   L1
XR 300 FOR L1=1 TO 5:COUNT2=COUNT2+1:HAND
   2(L1)=CARD(DECK):TYPE2(L1)=CARD1(DECK)
   :DECK=DECK-1:NEXT L1
GQ 310 TOP=CARD(DECK):TOP1=CARD1(DECK):X=
   2:Y=18:VALUE=TOP:VALUE1=TOP1:GOSUB 850
   :DECK=DECK-1
XN 320 POKE 53277,3:POKE DL+21,130
OA 330 POSITION 8,17:? "DECK:";DECK,"COMP
   UTER:";COUNT2;" ":GOSUB 1420:IF COUNT2
   =0 THEN 1550
HG 340 ? "IT IS NOW YOUR TURN":? "1-DRAW
   FROM DECK":? "2-PUT CARD IN PILE":? "3
   -PASS"
GQ 350 POKE 694,0:POKE 702,64:POKE 764,25
   5
MZ 355 OPEN #1,4,0,"K:":GET #1,CHOICE:CLO
   SE #1:IF CHOICE<49 OR CHOICE>51 THEN 3
   50
QW 360 GOSUB 1420:ON CHOICE-48 GOTO 370,4
   20,720
PE 370 IF COUNT1=18 THEN ? "YOU CAN ONLY
   HAVE UP TO 18":? "CARDS YOUR HAND":GOS
   UB 1430:GOTO 330
QV 380 IF DECK<=0 THEN ? "THERE ARE NO MO
   RE CARDS TO DRAW":GOSUB 1430:DECK=0:GO
   TO 330
GP 390 COUNT1=COUNT1+1:FOR L1=1 TO 18:IF
   HAND1(L1)<>0 THEN NEXT L1
OE 400 VALUE=L1:GOSUB 1210:VALUE=CARD(DEC
   K):VALUE1=CARD1(DECK):GOSUB 850:HAND1(
   L1)=CARD(DECK):TYPE1(L1)=CARD1(DECK)
ZD 410 DECK=DECK-1:GOTO 330
LL 420 ? "PLEASE ENTER IN THE CARD'S RANK
   ":INPUT CHOICE$
TX 430 IF CHOICE$="AC" THEN PILE=1:GOTO 5
   70
VL 440 IF CHOICE$="TW" THEN PILE=2:GOTO 5
   70
MI 450 IF CHOICE$="TH" THEN PILE=3:GOTO 5
   70
JH 460 IF CHOICE$="FO" THEN PILE=4:GOTO 5
   70
GK 470 IF CHOICE$="FI" THEN PILE=5:GOTO 5
   70
QE 480 IF CHOICE$="SI" THEN PILE=6:GOTO 5
   70
OR 490 IF CHOICE$="SE" THEN PILE=7:GOTO 5
   70
IV 500 IF CHOICE$="EI" THEN PILE=8:GOTO 5
   70
PZ 510 IF CHOICE$="NI" THEN PILE=9:GOTO 5
   70
KG 520 IF CHOICE$="TE" THEN PILE=10:GOTO
   570
CG 530 IF CHOICE$="JA" THEN PILE=11:GOTO
   570
VZ 540 IF CHOICE$="QU" THEN PILE=12:GOTO
   570
LB 550 IF CHOICE$="KI" THEN PILE=13:GOTO
   570
GY 560 ? "THERE IS NO SUCH CARD":GOSUB 14
   30:GOTO 330
XN 570 GOSUB 1460:IF CHOICE<>155 THEN 330
IN 580 GOSUB 1420:? "PLEASE ENTER IN THE
   TYPE OF":? "CARD":INPUT CHOICE$:GOSUB
   1470
KT 590 IF CHOICE$="" THEN ? "THERE IS NO
   SUCH THING":GOSUB 1430:GOTO 330
XA 600 GOSUB 1460:IF CHOICE<>155 THEN 330
KF 610 FOR L1=1 TO 18:IF HAND1(L1)<>PILE
   OR TYPE1(L1)<>PILE1 THEN NEXT L1:GOTO
   710
IN 620 IF PILE<>TOP AND PILE1<>TOP1 AND P
   ILE<>8 THEN ? "YOU CANNOT PUT THIS CAR
   D DOWN":GOSUB 1430:GOTO 330
HQ 630 IF PILE=8 THEN 680
AE 640 COUNT1=COUNT1-1:VALUE=L1:GOSUB 121
   0:FOR L=0 TO 4:POSITION X,Y+L:? "
   ":NEXT L
KO 650 X=2:Y=18:VALUE=HAND1(L1):VALUE1=TY
   PE1(L1):GOSUB 850:TOP=HAND1(L1):TOP1=T
   YPE1(L1)
YX 660 HAND1(L1)=0:TYPE1(L1)=0:IF COUNT1=
   0 THEN 1540
PO 670 GOTO 730
HS 680 GOSUB 1420:? "WHAT TYPE OF CARD DO
    YOU WANT":INPUT CHOICE$:GOSUB 1470
FP 690 IF CHOICE$="" THEN ? "THERE IS NO
   SUCH THING":GOSUB 1430:GOTO 680
FB 700 TYPE1(L1)=PILE1:GOTO 640
TA 710 ? "YOU DO NOT HAVE SUCH A CARD":GO
   SUB 1430:GOTO 330
TT 720 IF COUNT1<18 AND DECK>0 THEN ? "YO
   U NEED TO HAVE 18 CARDS TO":? "PASS":G
   OSUB 1430:GOTO 330
MM 730 GOSUB 1420:GOSUB 1430:? "IT IS THE
    COMPUTER'S TURN"
WV 740 FOR L1=1 TO 18:IF HAND2(L1)<>TOP A
   ND TYPE2(L1)<>TOP1 AND HAND2(L1)<>8 TH
   EN NEXT L1:GOTO 800
TG 745 FOR L=L1 TO 18:IF HAND2(L)<>TOP AN
   D TYPE2(L)<>TOP1 AND HAND2(L)<>8 THEN
   NEXT L1:GOTO 750
JS 746 IF INT(RND(0)*2)+1=1 THEN L1=L
EW 750 IF HAND2(L1)=8 THEN 780
GC 760 X=2:Y=18:VALUE=HAND2(L1):VALUE1=TY
   PE2(L1):GOSUB 850:TOP=HAND2(L1):TOP1=T
   YPE2(L1):HAND2(L1)=0:TYPE2(L1)=0
QD 770 POSITION 8,20:? "I HAVE PLACED DOW
   N ONE OF MY":? "CARDS":COUNT2=COUNT2-1
   :GOSUB 1430:GOTO 330
DE 780 PILE1=INT(RND(0)*4)+1:FOR L=1 TO 1
   8:IF TYPE2(L)<>PILE1 OR TYPE2(L)=8 THE
   N NEXT L:GOTO 780
JE 790 TYPE2(L1)=PILE1:GOTO 760
RW 800 IF DECK<=0 THEN FOR L=1 TO 18:IF H
   AND1(L)<>TOP AND TYPE1(L)<>TOP1 AND HA
   ND1(L)<>8 THEN NEXT L:GOTO 1530
AX 810 IF DECK<=0 OR COUNT2=18 THEN ? "I
   WILL HAVE TO PASS":GOSUB 1430:DECK=0:G
   OTO 330
MH 820 POSITION 8,19:? "I WILL DRAW A CAR
   D":FOR L=1 TO 18:IF HAND2(L)<>0 THEN N
   EXT L
AG 830 COUNT2=COUNT2+1:HAND2(L)=CARD(DECK
   ):TYPE2(L)=CARD1(DECK):GOSUB 1430:DECK
   =DECK-1:GOTO 730
GO 850 FOR L=0 TO 4:POSITION X,Y+L:SOUND
   0,PEEK(20),10,15:SOUND 1,PEEK(20),10,1
   5:SOUND 2,PEEK(53770),10,15
BO 860 FOR D=1 TO 10:NEXT D:? "█████":NEX
   T L:FOR L=0 TO 2:SOUND L,0,0,0:NEXT L
JR 870 POSITION X,Y:ON VALUE GOSUB 900,91
   0,920,930,940,950,960,970,980,990,1000
   ,1010,1020
XE 880 POSITION X+4,Y+4:ON VALUE GOSUB 90
   0,910,920,930,940,950,960,970,980,1030
   ,1000,1010,1020
OS 890 ON VALUE GOSUB 1040,1050,1060,1070
   ,1080,1090,1100,1110,1120,1130,1040,10
   40,1040:RETURN
YC 900 ? "A":RETURN
TO 910 ? "2":RETURN
TY 920 ? "3":RETURN
UI 930 ? "4":RETURN
US 940 ? "5":RETURN
VC 950 ? "6":RETURN
VM 960 ? "7":RETURN
```

continued on next page

```
VW 970 ? "8":RETURN
WG 980 ? "9":RETURN
YU 990 ? "10":RETURN
RX 1000 ? "J":RETURN
UL 1010 ? "Q":RETURN
SM 1020 ? "K":RETURN
NC 1030 POSITION X+3,Y+4:? "10":RETURN
FO 1040 GOSUB 1140:RETURN
WL 1050 NMB=1:NMB1=3:STEP=2:COL=2:GOSUB 1
   150:RETURN
VQ 1060 NMB=1:NMB1=3:STEP=1:COL=2:GOSUB 1
   150:RETURN
KF 1070 NMB=1:NMB1=3:STEP=2:COL=1:GOSUB 1
   150:COL=3:GOSUB 1150:RETURN
HD 1080 NMB=1:NMB1=3:STEP=2:COL=1:GOSUB 1
   150:COL=3:GOSUB 1150:GOSUB 1140:RETURN
JN 1090 NMB=1:NMB1=3:STEP=1:COL=1:GOSUB 1
   150:COL=3:GOSUB 1150:RETURN
FJ 1100 NMB=1:NMB1=3:STEP=1:COL=1:GOSUB 1
   150:COL=3:GOSUB 1150:GOSUB 1140:RETURN
FN 1110 NMB=1:NMB1=3:STEP=1:COL=1:GOSUB 1
   150:COL=3:GOSUB 1150:GOSUB 1050:RETURN
IG 1120 NMB=1:NMB1=3:STEP=1:COL=1:GOSUB 1
   150:COL=3:GOSUB 1150:GOSUB 1060:RETURN
ZT 1130 NMB=1:NMB1=3:STEP=1:COL=1:GOSUB 1
   150:COL=3:GOSUB 1150:GOSUB 1050:NMB=0:
   NMB1=4:STEP=4:COL=2:GOSUB 1150:RETURN
JQ 1140 POSITION X+2,Y+2:GOSUB 1160:RETUR
   N
YH 1150 FOR L=NMB TO NMB1 STEP STEP:POSIT
   ION X+COL,Y+L:GOSUB 1160:NEXT L:RETURN
EX 1160 ON VALUE1 GOTO 1170,1180,1190,120
   0
TE 1170 ? "[graphic]":RETURN
AN 1180 ? "[graphic]":RETURN
YY 1190 ? "[graphic]":RETURN
JA 1200 ? "[graphic]":RETURN
XV 1210 IF VALUE<7 THEN ON VALUE GOTO 124
   0,1250,1260,1270,1280,1290
PD 1220 IF VALUE<13 THEN ON VALUE-6 GOTO
   1300,1310,1320,1330,1340,1350
FJ 1230 ON VALUE-12 GOTO 1360,1370,1380,1
   390,1400,1410
TR 1240 X=2:Y=0:RETURN
VQ 1250 X=8:Y=0:RETURN
QD 1260 X=14:Y=0:RETURN
PE 1270 X=20:Y=0:RETURN
RJ 1280 X=26:Y=0:RETURN
QK 1290 X=32:Y=0:RETURN
WB 1300 X=2:Y=6:RETURN
YA 1310 X=8:Y=6:RETURN
ST 1320 X=14:Y=6:RETURN
RU 1330 X=20:Y=6:RETURN
TZ 1340 X=26:Y=6:RETURN
TA 1350 X=32:Y=6:RETURN
OD 1360 X=2:Y=12:RETURN
QC 1370 X=8:Y=12:RETURN
MO 1380 X=14:Y=12:RETURN
LP 1390 X=20:Y=12:RETURN
MS 1400 X=26:Y=12:RETURN
LT 1410 X=32:Y=12:RETURN
RO 1420 FOR L=18 TO 22:POSITION 8,L:? "
                              ":NEXT L:
   POSITION 8,18:RETURN
HM 1430 POKE 20,0
KZ 1440 IF PEEK(20)<>60 THEN 1440
AW 1450 RETURN
QY 1460 ? "PRESS RETURN IF YOU ARE SURE":
   POKE 764,255:OPEN #1,4,0,"K:":GET #1,C
   HOICE:CLOSE #1:RETURN
IO 1470 IF CHOICE$="HE" THEN PILE1=1:RETU
   RN
KC 1480 IF CHOICE$="DI" THEN PILE1=2:RETU
   RN
MZ 1490 IF CHOICE$="CL" THEN PILE1=3:RETU
   RN
BH 1500 IF CHOICE$="SP" THEN PILE1=4:RETU
   RN
VR 1510 CHOICE$="":RETURN
AJ 1530 ? "LOOKS LIKE THAT WE HAVE A TIE"
   :GOTO 1560
JU 1540 GOSUB 1420:? "CONGRATULATIONS, YO
   U WON":GOTO 1560
LV 1550 ? "SORRY THAT YOU LOST. TRY AGAIN
   "
GQ 1560 GOSUB 1430:? "PRESS START TO BEGI
   N A NEW GAME":FOR L=255 TO 0 STEP -1:P
   OKE 712,L:NEXT L
DM 1570 IF PEEK(53279)<>6 THEN POKE 704,P
   EEK(20):GOTO 1570
NU 1580 RUN
ZT 1590 POKE 559,1:RESTORE :DL=PEEK(560)+
   PEEK(561)*256:POKE DL+21,130:POKE 710,
   0
```

the toolbox

PARALLEL BUS REVEALED

Article on page 49

LISTING 1

```
10 ; Parallel Device Handler Example
20 ; By Earl Rice
30 ; ANTIC Magazine
40 ;
50 ;(ASM,,#D:MYFILE.OBJ) because the o
bj code is put
60 ;where there is no RAM available.
70         .OPT OBJ
80 ;  EQUATES
90 PDVMSK = $0247    ;Parallel device
mask (indicates which are
0100 PDIMSK = $0249   ;Parallel interru
pt mask (not used in this
0110 GPDVV = $E48F    ;Generic Parallel
 Device Vector
0120 ;
0130 HATABS = $031A   ;Device handler t
able
0140 CRITIC = $42     ;Critical code se
ction flag
0150 ;
0160 DEVNAM = 'T      ;Device name, E.G
. T for "Telephone".
0170 HWGET = $D100    ;Hardware GET reg
```

```
ister
0180 HWPUT = $D100    ;Hardware PUT reg
ister.
0190 HWRSET = $D101   ;Hardware reset (
clears get register).
0200 HWSTAT = $D101   ;Hardware STATUS
register.
0210 ;
0220       *=   $D800
0230 ; Rom vector table
0240       .WORD 0     ;Optional ROM che
cksum
0250       .BYTE 0      ;Optional Revisio
n number
0260       .BYTE $80    ;Mandatory ID num
ber
0270       .BYTE 0      ;Optional Name or
 Type
0280       JMP NONEED  ;Lo-level IO vect
or, which we don't need
0290       JMP NONEED  ;IRQ handler vect
or, which we don't need.
0300       .BYTE $91    ;Mandatory ID num
ber
0310       .BYTE DEVNAM ;Device name
0320       .WORD NONEED-1 ;Open vector,
which we don't need.
0330       .WORD NONEED-1 ;CLOSE vector,
 which we don't need.
0340       .WORD GETBYT-1 ;GET BYTE vect
or.
0350       .WORD PUTBYT-1 ;PUT BYTE vect
or.
0360       .WORD GETSTA-1 ;GET STATUS ve
ctor.
0370       .WORD NONEED-1 ;SPECIAL vecto
r, which we don't need.
0380       JMP INIT     ;INIT vector at P
ower up or reset.
0390       .BYTE 0      ;NOT USED.
0400 ;
0410 ;CODE STARTS HERE
0420 ;
0430 ;Initialize device and device han
dler
0440 INIT
0450       LDA PDVMSK  ;Get enabled devi
ce flags
0460       ORA #1       ;Set bit 0.
0470       STA PDVMSK  ;& replace.
0480 ;Note: if device used interrupts
we would set bit 0 of
0490 ;
0500 ;Put device name in Handler table
 HATABS
0510       LDX #0
0520 ;          Top of loop
0530 SEARCH
0540       LDA HATABS,X ;Get a byte from
 table
0550       BEQ FNDIT    ;0? Then we found
 space.
0560       INX
0570       INX
0580       INX
0590       CPX #36      ;Length of HATABS
0600       BCC SEARCH  ;Still looking
0610       RTS          ;No room in HATAB
S; device not initialized
0620 ;
0630 ;           We found a spot.
0640 FNDIT
0650       LDA #DEVNAM ;Get device name.
0660       STA HATABS,X ;Put it in blank
 spot.
0670       INX
0680       LDA #GPDVV&$FF ;Get lo byte o
f vector.
0690       LDA #GPDVV/$0100 ;Get hi byte
 of vector.
0700       STA HATABS+2,X
0710       RTS
0720 ;
0730 ; GET BYTE routine.
0740 GETBYT
0750       LDA #0
0760       STA CRITIC   ;Enable deferred
 vertical blank.
0770       LDA HWGET    ;Get a byte from
hardware.
0780       STA HWRSET   ;Reset hardware.
0790       SEC          ;Indicate we hand
led it.
0800       RTS
0810 ;
0820 ; PUT BYTE routine.
0830 PUTBYT
0840       LDX #0
0850       STX CRITIC   ;Enable deferred
 vertical blank.
0860       STA HWPUT    ;Put byte to hard
ware.
0870       SEC          ;Indicate we hand
led it.
0880       RTS
0890 ;
0900 ; GET STATUS routine.
0910 GETSTA
0920       LDA #0
0930       STA CRITIC   ;Enable deferred
 vertical blank.
0940       LDA HWSTAT   ;Get HW status.
0950       SEC          ;Indicate we hand
led it.
0960       RTS
0970 ;
0980 ; Do nothing routine.
0990 NONEED
1000       SEC          ;Indicate we hand
led it.
1010       RTS
1020 ;
1030 ;
1040       .END
```

product reviews

WHISTLER'S BROTHER

Broderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
48K disk
$29.95

Reviewed by Jack Powell

Another ladder game? Yes . . . but **Whistler's Brother** is worth a second look. It has a sense of style, humor and pizzazz, plus Broderbund's special touch of whimsy.

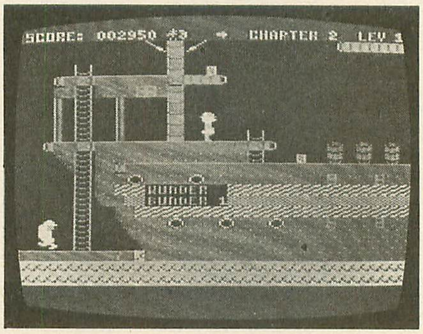
Your absent-minded brother has just returned from an archaeological expedition in the rain forests of South America. (I know, another archaeologist.) Unfortunately, he has left behind all his tools, documents and treasures, so it is up to you to retrace his steps and recover the lost goodies.

This could be just another treacherous series of adventures, avoiding various traps and creatures, save that your brother is with you with his nose buried in a map. The only way you can keep him safely by your side is to whistle. But all is not chaos! You have studied sufi dancing with a local whirling dervish and can whirl your way past many of the dangers.

The style of the game is Saturday-afternoon serial melodrama and each of the 13 smooth-scrolling screens is a chapter. Our compliments to the programmer, Louis Ewens. The animation and graphics are excellent and the two characters are comically represented. Your brother helplessly putters along with his face hidden in a manuscript while you stomp by in a posture of barely contained frustration, clutching a rolled-up map.

The sound is clever at first, but soon becomes annoying. The background music can be turned off, but there remain the familiar clicks, squeeks and beeps that Atari owners have learned to expect from games originally designed on the limited Apple.

The documentation is cute, but inadequate. There are just not enough



specifics of game play. Even getting past the first screen almost requires a software pirate's expertise at deciphering programs minus documentation. Since Broderbund is a leader in the fight against piracy, they have no excuse for providing inferior documentation.

PARTY QUIZ

Suncom
260 Holbrook Drive
Wheeling, IL 60090
(312) 459-8000
32K disk
$74.95

Reviewed by Michael Ciraolo

Party Quiz is a computerized trivia game that gets an "A" for good play mechanics, "C" for pointless questions—and "D" for outdated packaging that features a hokey photo of two semi-Yuppie couples grinning in fake delight as they play. "PQ makes your computer more sociable," claims the ad copy on the box. Uh-huh.

For your $79.95 you get four hand-held controllers and two disks. The controllers are an excellent idea. They have four-foot cables that plug into a central switch box, which in turn plugs into the two joystick ports. Each controller has large orange keys numbered from one to four. So all you need to do is be the first player to press the key with the number of the right answer appearing on the screen. (But check your controllers as soon as possible—we found that one of ours was broken the first time we tried using it.)

The mechanics of PQ are good. You can easily set a game from one to four players, select your choice of response time, the number of rounds and so on. The space bar pauses the action—giving you time to think of the answer without the clock running. The faster you answer, the more points you get. You can also handicap any of your friends who win too often.

But then there are those 2,500-plus questions . . . I really didn't think that "6X14=?" qualified as a trivia question, even with new math. On the initial disk (you can get supplemental question disks), several questions asked for the number of days in certain months, area codes around the country, time zones of major cities, and other off-the-wall items.

One supplemental disk had four questions in a row about Monopoly. Sprinkled throughout are questions about history (mostly American, post-1775) and science. Can you name the chemical elements from their symbols?

But most of the questions deal with middle-American lore—do you know what networks air "Dallas" or the "Tonight Show?" What motor company made the Eagle? A substantial knowledge of American movies helps too.

Despite the complaints, this game is not bad. Trivia gaming turns out to be well suited to your Atari, especially with those well-conceived controllers. If the questions were more entertaining—as in "Trivial Pursuit" — Party Quiz could qualify as excellent.

product reviews

SERPENT'S STAR

Broderbund
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
48K disk
$39.95

Reviewed by Michael Ciraolo

Mac Steele has returned from tromping around the Central American pyramids in search of the **Mask of the Sun** This time, he's off to Tibet, seeking **The Serpent's Star**.

Your typical adventurer, Mac is interested in the Serpent's Star gem for the money it will bring on the black market. Fortunately, he also needs his classical training as an archaeologist—as will you, if you are to solve all the puzzles.

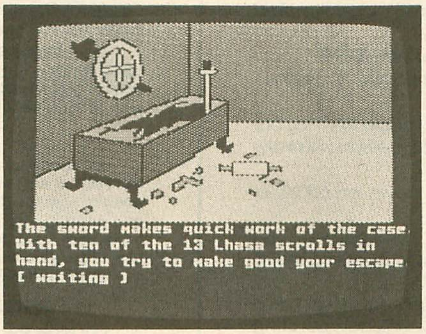
The latest graphics/text adventure from Broderbund is set in craggy Tibet among a gaggle of Buddhist monks. A knowledge of their religion will be a slight aid in solving the game's puzzles. (It also helps to be nice to religious strangers . . . .)

You can expect a variety of puzzles. Of course, you'll need to collect the proper materials during your Himalayan trek. You'll be quizzed by monks, forced to dodge an avalanche, required to negotiate the obligatory maze, and in many cases trapped in a dead end. Many of the puzzles in the Star must be solved in proper order. Otherwise, you'll need to go back to the beginning or SAVE to disk.

To communicate with the game, you have an adequate parser capable of understanding multiple commands in one sentence. It is not advanced enough to rival real life, or even Infocom games. But it doesn't slow the game too much.

All of this makes for a good, challenging game. There are some complaints about speed, however. Writing to, and reading from, the SAVE disk takes a great deal of time—nearly two minutes to load a saved game.

Also slowing play are the extensive road scenes. Every move outside a building takes several screens of peaks



and valleys. The page flipping that does this is technically pleasing, but the repetitive scenes quickly become boring.

SPACE WASTE RACE

POCKETS: Speech Parts Game

Sunburst Communications, Inc.
39 Washington Ave.
Pleasantville, NY 10570
(800) 431-1934
$55 each, 48K-disk

Reviewed by Anita Malnig

At the foggy end of Geary Boulevard in San Francisco, just a few blocks from the ocean, you'll find a seafood cafe with a converted-apartment office upstairs. Nestled way out here is the western branch of Sunburst Communications, educational software developers.

Jack Perron, ex-Atari employee with an English Education Ph.D., leads this group of young programmers and designers who have just produced some stimulating learning games for their Pleasantville, New York parent company.

SPACE WASTE RACE

Space Waste Race's colorful graphics and super sound (kids will love the GRRRR and WHOOOSSH of the rocket taking off) were designed by programmer Peter Wierzbicki, a midnight Atari hacker and former Teamster.

A child looks at an animated story, then plays games related to that story. Geared for four to eight year-olds, this software can provoke some thinking. Certainly, sending all the world's garbage into outer space is quite a thought.

You see a rocket blast the garbage away and compact it into a second moon that gives our old faithful moon a run for its money. The two moons race and collide. The reader is then given the choice of. . . "Would the garbage dirty the face of the human race, or the face of the man in the man in the moon??"

So what makes this different from a storybook? The child can play games and receive direct feedback. Not only do the games relate directly to the story, they teach important learning and comprehension skills.

The games teach counting skills, number and letter indentification, concepts of over/under and above/below, sequence of numbers and letters, directional concepts of up/down and left/right. In "Moondrops," bits of debris fall from the moon and the child must count the drops. "Hole in the Moon" lines up three moons, two with numbers or letters and the third a blank in sequence, such as AB__ or 1__3.

In "Fall Out," a letter, number, or symbol drops from the top of the screen. The child must press the key that matches the character shown. However, the characters seem too small. Young children need graphics that are big and bold.

The well-written documentation

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offers ways for teacher and parent to use the program and suggests additional activities.

POCKETS

Pockets: the Parts of Speech Game may just be the way to liven up school grammar lessons.

Here's an arcade-style game where students gain points racing against the clock while practicing parts of speech. Pockets comes in three levels: for 4th and 5th graders; for 6th and 7th graders; and for 8th grade through high school.

In level one, on the screen you see sentences such as, "Mary bought a lunch at school. She spilled the milk and felt very foolish."

Using a joystick (or arrow keys) the player moves Pocket the Kangaroo onto a word, picks the word up, moves upward to a colored pouch labeled with a part of speech like "verb" or "noun," and drops in the word. If a correct match was made, the pouch flashes and the player scores points. Also, the word in the sentence changes into inverse video, showing it's been identified correctly.

But watch out for the Rovers! If these little demons bump into the busy Kangaroo before a word is picked up, the player loses points.

The Teachers' Edition ($65) offers many helpful features. Teachers can edit the sentences and the parts of speech pouches. They can focus on adjectives and pronouns today, verbs and adverbs tomorrow.

Also, only the main program disk is copy-protected. The package includes data disks which can be copied for each student. This is one of the fairest solutions I've seen for this problem of pirating vs. high cost of software.

ABCs OF ATARI COMPUTERS

by David E. Mentley
Datamost
20660 Nordhoff Street
Chatsworth, CA 91311
(818) 709-1202
228 pages, paperbound
$14.95

Reviewed by Jack Powell

Each week **Antic** receives at least a hundred letters with questions about Atari computers. Atari users at all levels of experience want to know everything from how to blink the cursor to how many programming languages are available. Only a fraction of these letters can appear in our I/O Board pages and unfortunately the **Antic** editors simply would not have time to get out the magazine if we answered each letter personally.

Until now the answer to many of our readers' questions could only be found scattered throughout many books, technical manuals and magazine back-issues. New Atarians had no way of knowing where to look. And even experienced users would have a hard time remembering exactly where they saw that specific bit of information they need.

David Mentley's **ABCs of ATARI COMPUTERS** admirably fills this void. Mentley took over as president of the San Francisco Atari user's group, ABACUS, after founder James Capparell left to start **Antic** Magazine. During his 18 months as president, Mentley collected thousands of user newsletters from across the country. He compiled technical tips, tricks, and little known Atari facts from their pages and presented them alphabetically in a clear and concise style.

This book covers an incredible range. The author himself says it's primarily aimed at the beginner to intermediate user. But the book is so

continued on next page

product reviews

chock full of Atari trivia that experienced users are sure to enjoy it, if only to have all this stuff in one place for a change.

Would you like to know how to modify the 810 disk drive for greater accuracy? If you're a new user, you might just want to know what "Star Raiders" is. Plenty of newcomers are grimly trying to figure out what's "page six" while the rest of us assume everyone knows about it. How about a chart of printer control codes comparing many major brands?

This book is not going to replace the Atari Technical Reference Manual. But if you're planning to write a question to **Antic**, please look it up in ABCs of Atari Computers first. You'll save some time and postage.

G.E. COMPU-MATE DATA RECORDER

General Electric
Housewares & Audio Business Div.
P.O. Box 70050
Charlotte, NC 28272
(800) 626–2000
$69.95

Reviewed by Nicholas J. Worth

G.E.'s Compu-Mate computer data recorder is a viable alternative for Atari owners who are looking for a cassette unit.

The Compu-Mate is streamlined and compact. It comes with an interface module, a power cord/adaptor and cables for both the Atari and Commodore computers. The Atari cable connects the interface module to your I/O port or any other peripheral. The interface module also connects to the power supply, and has three built-in recorder plugs, the 6V DC, earphone and Mic/Rem.

Because it only has one I/O connection, the recorder must be the last item in a peripheral daisychain. Also, the interface module is a second unit taking up desk space. These are obviously shortcomings.

However, several features are very good. First, the RECORD and PLAY buttons are connected. When SAVING a program or data from the computer to the recorder you need only push the RECORD button—the PLAY button will automatically move with it.

The Compu-Mate also has LED indicators for RECORD and PLAY, along with a data level indicator. The data indicator works with an LED on the interface to let you know if recorded data is being transferred to the computer at the proper rate.

The Compu-Mate is streamlined and compact.

The recorder has a standard digital tape counter with reset button and a small, built-in speaker with volume control (for listening to the data transfer process). You can also switch between "Atari" and "All Others."

The recorder comes with an instruction booklet that is well-written —except that it doesn't mention the LIST "C:" and SAVE "C:" options open to Atari users.

Checking the Compu-Mate against the Atari 410 recorder by SAVING and LOADING several programs of varying lengths, I found that the Compu-Mate performed comparably with the Atari 410, but was faster on the REWIND and FAST FORWARD cycles. The Compu-Mate's smaller keys were more comfortable than those of the 410.

CONAN

Datasoft
19808 Nordhoff Place
Chatsworth, CA 91311
(818) 701-5161
48K disk
$39.95

Reviewed by Michael Ciraolo

The flowing hair and acrobatic leaps

product reviews

of **Conan** have joined Datasoft's Famous Faces series (**Bruce Lee, Dallas**).

Conan must fight his way through seven levels of giant floating eyeballs, dragons, flame monsters, electric spark creatures and other nasties to find and destroy the villian Volta.

The legendary barbarian can perform astounding jumps and tumbles; he can fall from any height, and throw his magical sword at foes.

Datasoft describes Conan as "surrealistic". Surely the purple trees add to that. You'll also encounter lava pits, large friendly birds, and transporter booths.

Datasoft describes Conan as "surrealistic."

All of this is combined with challenges typical of any ladder game. What detracts from the enjoyment are programming quirks such as Conan walking halfway through trees, standing in mid air, and so on. Conan lacks the crisp movements of **Whistler's Brother** or **Montezuma's Revenge**.

The greatest shortcoming is the game's excruciatingly long loading time for each screen. Considering there are only seven levels, no scrolling and no page flipping, this seems quite unnecessary.

Because you must go back to the beginning each time you exhaust your two initial lives, you can spend several minutes waiting to get back to the level of your death. Better take along some coffee on Conan's quest . . . .

UP AND DOWN

Sega Enterprises, Inc.
360 N. Sepulveda Blvd.
El Segundo, CA 90245
(213) 640-7600
16K cartridge
$19.95

Reviewed by David Plotkin

Up and Down is an unusual new driving game that's definitely worth a look. The object is to navigate your joystick-controlled car across the scrolling landscape, keeping to the roads and picking up flags as you go. When all flags have been captured, you move on to the next level. Attempting to prevent you from completing your mission are enemy vehicles—primarily pickup trucks—which will try to run you off the road.

The scrolling screens are viewed from three-quarter perspective, as in Zaxxon or Blue Max. This tends to make steering a little confusing at first, but you soon adjust. Your car also has the ability to leap into the air for short periods of time, as in Lunar Lander. This enables you to jump from one road to another, avoid enemies, hop over the chasms in higher levels, and even destroy your enemies by landing on top of them with a most satisfying "squish".

You may also slow down or back up, although I don't recommend this as a steady diet. You can't leap into the air while backing up, which leaves you vulnerable to enemies coming up fast from the rear. Further complicating your life are the hills (up and down!) which you must either climb with a running start, or speed downward at the worst times.

When several enemies appear on the same line of the acreen, they begin to flicker in a most distracting way, ala 2600 PacMan. This seems to be a function of the fact that all motion is by Player/Missile Graphics. But the flicker can be adjusted to, and it's not a fatal flaw. All in all, Up and Down is a lot of fun, with smoothly increasing levels of difficulty, unusual play mechanics and good sound effects.



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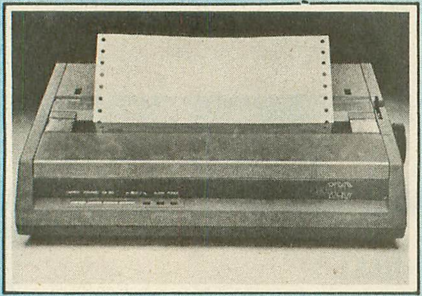
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OKIMATE 120

(printer)
Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
(609) 235-2600
$269



This is a bidirectional, logic-seeking dot-matrix printer capable of printing 120 characters per second. Its mean-time-between failure is 4,000 hours, and the print head prints 200 million characters before failure. Although the machine is being sold as fully graphics capable, no dot resolution was given with the announcement.

MORSECODE MASTER, REVERSI MASTER

(software)
New Horizons Software
P.O. Box 180253
Austin, TX 78718
$29.95 each
disk or cassette, 48K

Morsecode Master brings you the world of shortwave radio by teaching you Morse code.
Reversi Master teaches you the strategy needed to win the Reversi (Othello) game. It also starts the game from any initial position.

R-LINK

(serial modem interface)
Quantum Microsystems Inc.
P.O. Box 179
Liverpool, NY 13088
(315)-451-7747
$49.95

This interface, which includes disk and cable, connects the serial bus to a standard RS-232 modem, while providing you with another Atari jack for daisy-chaining. Operating at 9600 baud, it may be used with any device requiring an RS-232 interface.

SPACE BASE

(astronomical software)
Urania Systems
Box 4890
Richmond, VA 23220
(804) 358-4715
48K disk, joystick required
$34.95

Space Base is a large scrolling star map with cursor window, which lets you select from over 400 sky objects. You can gain instant access to the object's description, location and physical data.

85- CABLES

Advanced Interface Devices, Inc.
P.O. Box 2188
Melbourne, FL 32901
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From $19.95

These cables connect the Atari 850 interface box to RS-232 devices such as modems and printers. They connect to the standard DB-25 Atari I/O port.

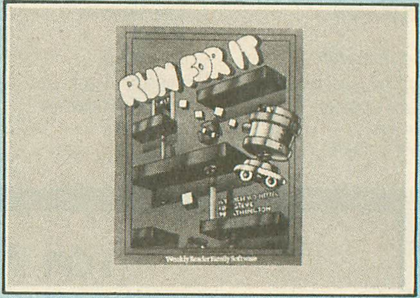
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Mindscape, Inc.
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(game)
Weekly Reader Family software
245 Long Hill Road
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48K disk
$39.95



Yet another game offering "family fun that is fast and furious." Orbit the Robot must dodge bad robots through a series of rooms.

U.S. DOUBLER

(disk drive modification)
ICD, Inc.
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This two-chip set installs in the 1050 disk drive to produce true double density storage.

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